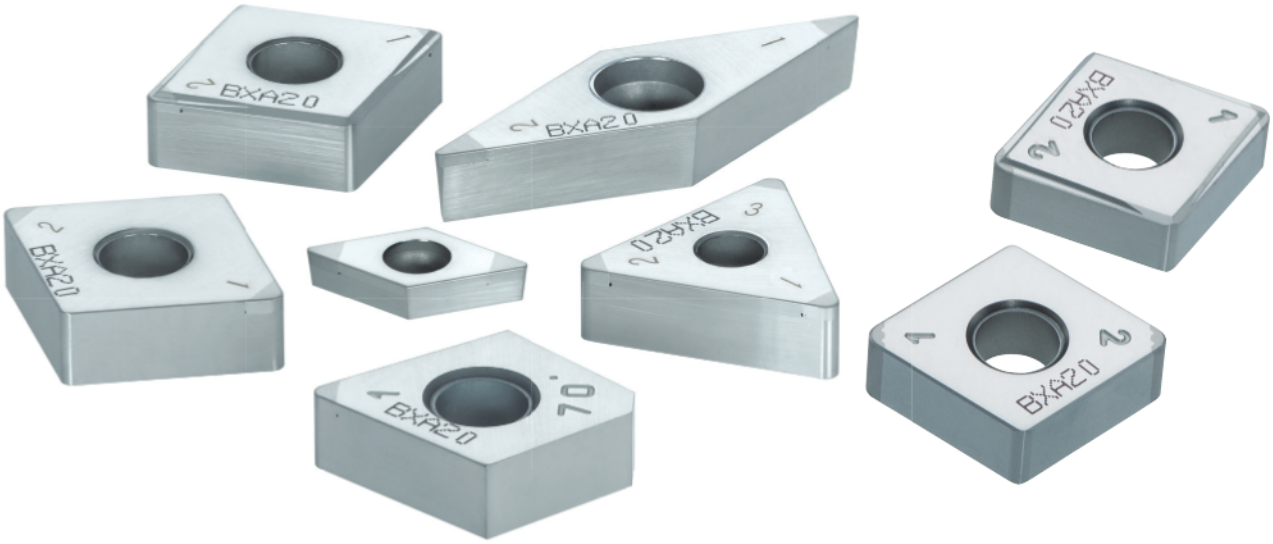
BXA20

- Coated CBN grade for hardened steel



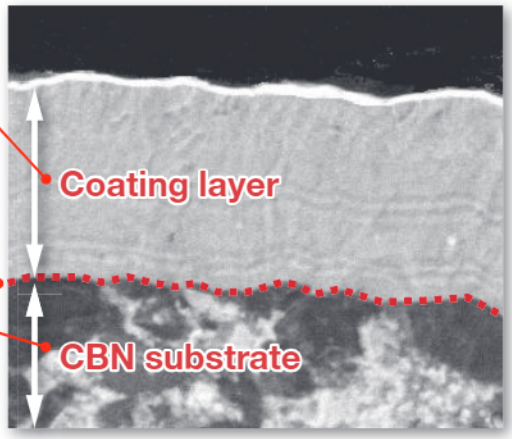
Incredible reliability in hardened steel turning

- Suitable for operations at low to medium cutting speed
- Covers a wide range of application areas from continuous to heavy interrupted cutting

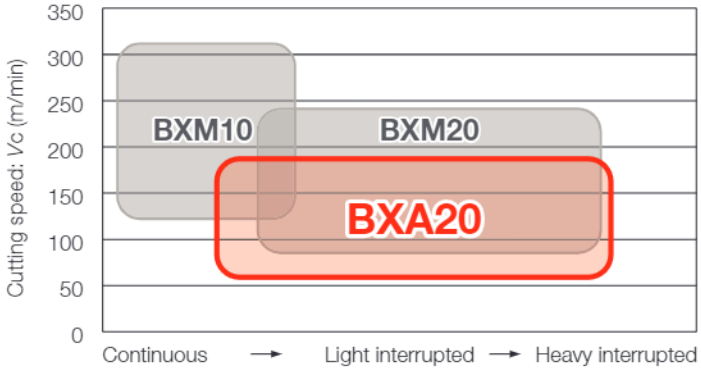
Multi-layered coating 2 times thicker than the conventional grade
- Provides excellent wear resistance

Improved adhesion strength
- Prevents peeling-off, providing excellent surface finish

Newly developed CBN substrate with unique binder
- Optimum CBN content for high wear resistance and toughness



APPLICATION AREA



BXM10
Suitable for continuous to light interrupted cutting at high speed

BXM20
Suitable for a wide range of applications at medium to high speed

BXA20
Exceptional stability in machining at low to medium speed

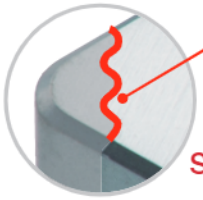
T-CBN SERIES

- WavyJoint

For **high efficiency** hardened steel machining

New brazing technology for increased machining efficiency - "WavyJoint"

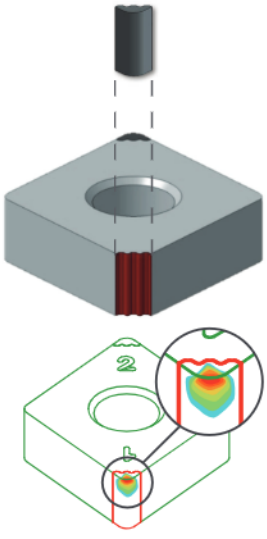
- A maximum depth of cut up to 0.8 mm
  → Reduces the number of passes to increase productivity

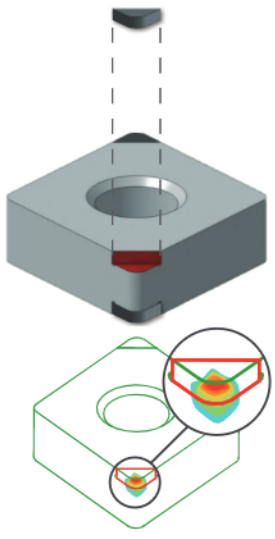


The "wavy" contact surface enhances the brazing strength.

Strong joint

WavyJoint BXA20 **Vs.** Standard





CBN tip size:

Using the cBN tip in a mass as large as **200%** provides increased thermal conductivity and helps reduce the temperature at the cutting edge

Brazing area:

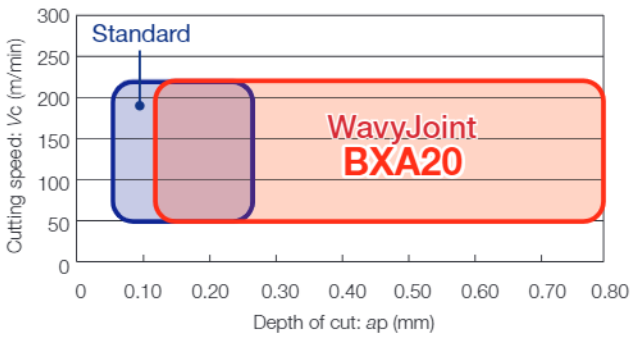
Increased **160%** for enhanced brazing strength

Temperature during machining is concentrated on the CBN tip, reducing temperature issues in the brazing zone.

Workpiece material	: SCM420 / 20CrMo4 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *fz* = 0.20 mm/rev
Depth of cut	: *ap* = 0.75 mm
Coolant	: Dry

APPLICATION AREA

Hard Turning

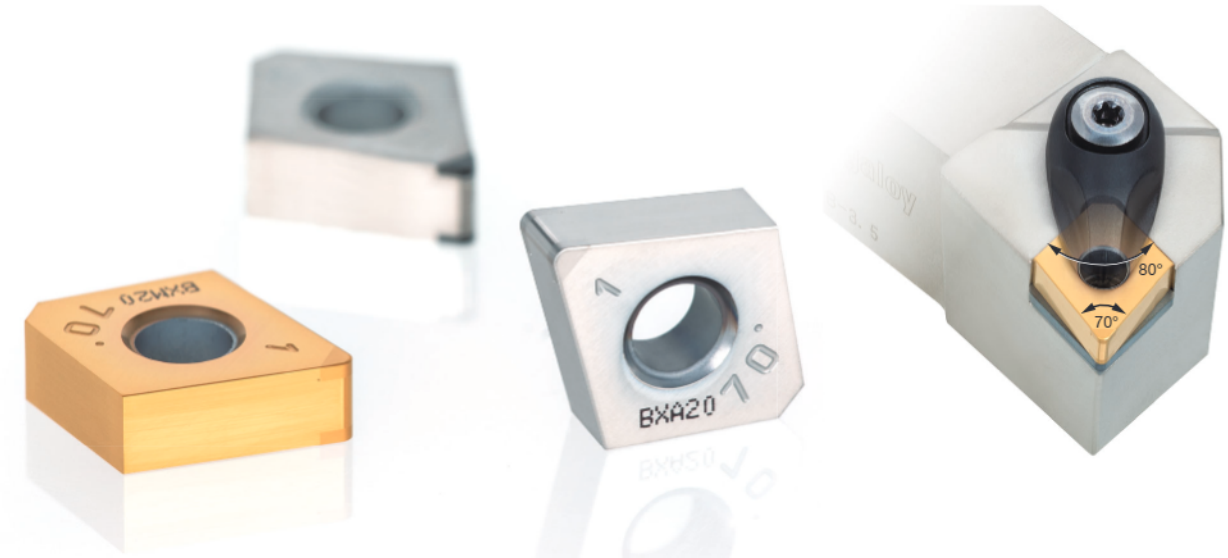


H

WavyJoint BXA20

Great performance for continuous to heavy interrupted cutting at low and medium speeds.

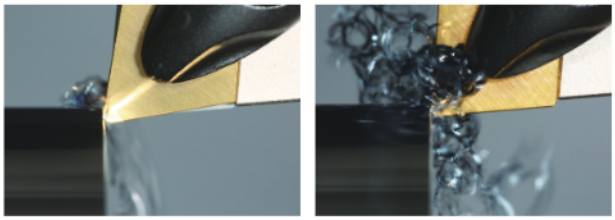
T-CBN SERIES - GNGA type CBN



For **high efficiency in finishing** hardened steel, cast iron and sintered metals

Chip control in face turning

Continuous cutting



GNGA type
Corner angle: 70°

CNGA type
Corner angle: 80°

Since GNGA type inserts have enough space for chip flow, chip packing doesn't occur, improving surface finish and preventing sudden chipping on cutting edge.
Existing standard toolholders for CNGA1204 can be used.

Interrupted cutting

GNGA type
Corner angle: 70°

CNGA type
Corner angle: 80°

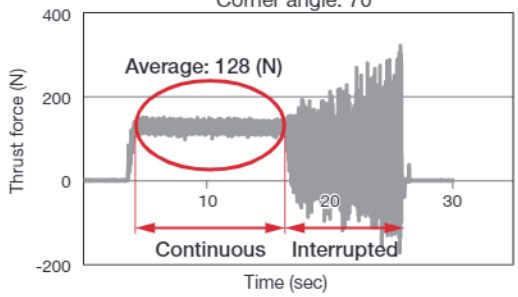
H

Toolholder : ACLNL2525M12-A
Insert : 2QP-GNGA120408 BXM20
2QP-CNGA120408 BXM20
Workpiece material : SCM420 / 18CrMo4 (60HRC)
Cutting speed : *Vc* = 150 m/min
Feed : *f* = 0.10 mm/rev
Depth of cut : *ap* = 0.125 mm
Machining : Face turning
Coolant : Dry

CUTTING PERFORMANCE

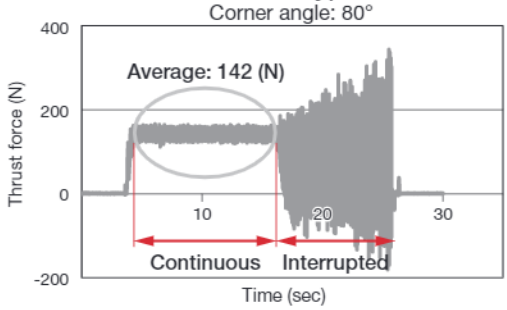
Cutting force
(Thrust force)

GNGA type
Corner angle: 70°



GNGA type has large clearance and reduces cutting force compared to the regular CNGA type.

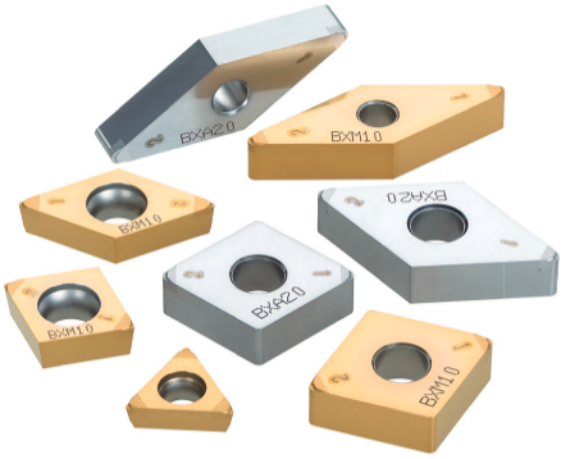
CNGA type
Corner angle: 80°



H

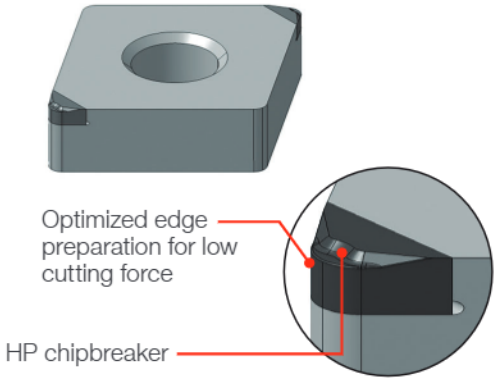
Toolholder : ACLNL2525M12-A
Insert : 2QP-GNGA120408 BXM20
2QP-CNGA120408 BXM20
Workpiece material : SCM420 / 18CrMo4 (59HRC)
Cutting speed : *Vc* = 150 m/min
Feed : *f* = 0.15 mm/rev
Depth of cut : *ap* = 0.125 mm
Machining : Face turning
Coolant : Dry

HARDBREAKER HP



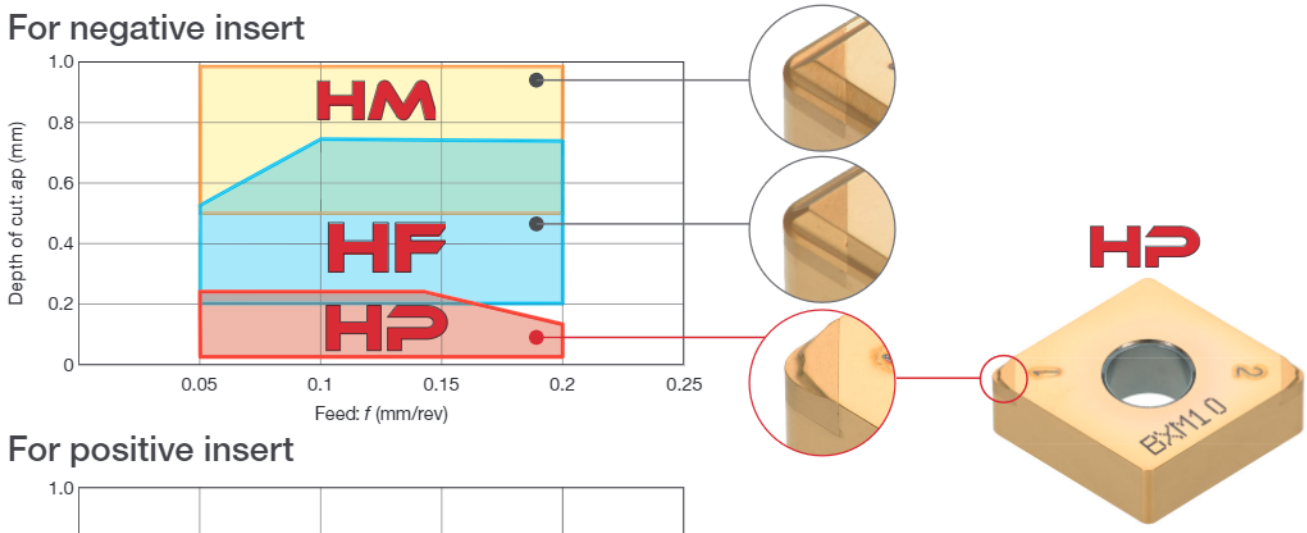
New HP Chipbreaker for Finishing Hardened Steel

1. By separating the chipbreaker from the cutting edge, the cutting force imposed on the cutting edge during machining is significantly reduced, thus providing long tool life.
2. The cutting edge preparation is designed to ensure easy cutting at low cutting forces, while maintaining close tolerances with no deviations.
3. The HP style chipbreaker, combined with built-in wipers, yields excellent surface quality and good chip control.

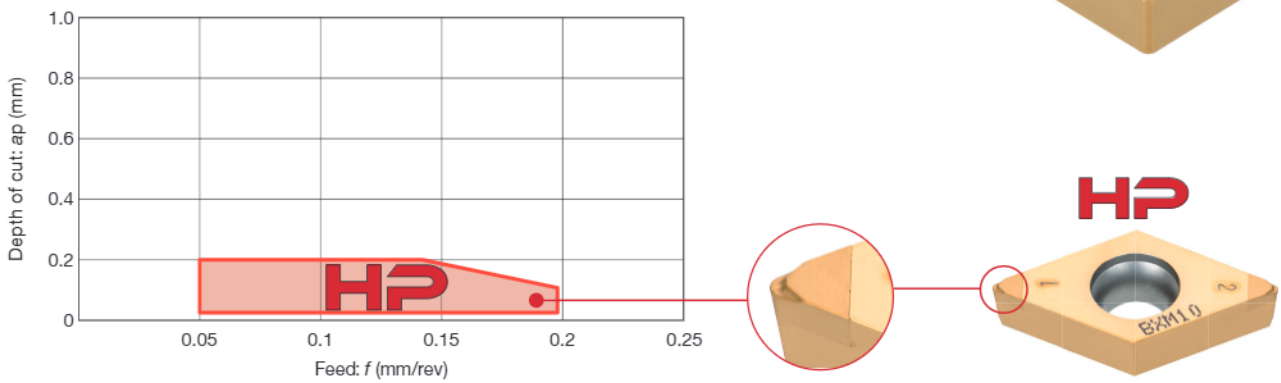


APPLICATION AREA

For negative insert



For positive insert



Designation System for T-CBN (PCBN) Inserts

Multi-Corner type

2 QP - CNGA120404 -L

① Number of corners

② Type	
QP	CBN Inserts
QS	WavyJoint

③ ISO symbol

④ Special feature & chipbreaker			
Without	Standard honing	W	With wiper
F	Sharp edge	W□	With wiper
-L	Wear resistance priority	-HF	With chipbreaker
-LF	Flank wear resistance priority	-HM	With chipbreaker
-LC	Crater wear resistance priority	-HP	With chipbreaker
-H	Fracture resistance priority		

Multi-Corner type (10 pieces per package)

T 2 QP - CNGA120408

① "T" means 10 pieces per package.

For general turning

TNGA160402 - QBN

① ISO symbol

② CBN inserts

T-CBN (PCBN tipped) grooving inserts

XG R 63 10 S - QBN

① For grooving tool GX-type

② Hand of Insert	
L	Left
R	Right

③ Groove width (mm)	
10	1.0
15	1.5

④ Corner radius: RE (mm)	
S	0.2

⑤ CBN inserts

For TUNGCUT

S G N 200 - 020

① Number of edge	
S	Single corner

② Application	
G	Grooving

③ For use	
N	Non breaker

④ Groove width (mm)	
200	2.0

⑤ Corner radius: RE (mm)	
020	0.2

Designation System for T-DIA (PCD) Inserts

Inserts for turning

TPGW110204 - DIA

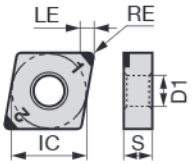
① ISO symbol

② PCD inserts

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX380	BX470	BX480	BX930
P	Steel								◐	✣	◐
M	Stainless								◐	✣	◐
K	Cast iron								◐	✣	◐
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐	◐	●	◐	◐	✣			
	Sintered metal								◐	◐	✣



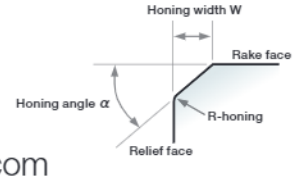
Shape	Designation	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-CNGA	2QP-CNGA120404	2	2.3	0.4	12.7	4.76	5.16	○							
	2QP-CNGA120408	2	2.2	0.8	12.7	4.76	5.16	○							
	2QP-CNGA120412	2	2.4	1.2	12.7	4.76	5.16	○							
	2QP-CNGA120416	2	3.3	1.6	12.7	4.76	5.16	○							
	2QP-CNGA120420	2	3.2	2.0	12.7	4.76	5.16	○							
	2QP-CNGA120424	2	3.1	2.4	12.7	4.76	5.16	○							
T2QP-CNGA	T2QP-CNGA120404	2	2.3	0.4	12.7	4.76	5.16	○							
	T2QP-CNGA120408	2	2.2	0.8	12.7	4.76	5.16	○							
2QP-CNGA**F	2QP-CNGA120404F	2	2.3	0.4	12.7	4.76	5.16		○						
	2QP-CNGA120408F	2	2.2	0.8	12.7	4.76	5.16		○						
2QP-CNGA**-L	2QP-CNGA120404-L	2	2.3	0.4	12.7	4.76	5.16			○					
	2QP-CNGA120408-L	2	2.2	0.8	12.7	4.76	5.16			○					
	2QP-CNGA120412-L	2	2.4	1.2	12.7	4.76	5.16			○					
2QP-CNGA**-LF	2QP-CNGA120404-LF	2	2.3	0.4	12.7	4.76	5.16				○				
	2QP-CNGA120408-LF	2	2.2	0.8	12.7	4.76	5.16				○				
	2QP-CNGA120412-LF	2	2.4	1.2	12.7	4.76	5.16				○				
2QP-CNGA**-LC	2QP-CNGA120404-LC	2	2.3	0.4	12.7	4.76	5.16					○			
	2QP-CNGA120408-LC	2	2.2	0.8	12.7	4.76	5.16					○			
	2QP-CNGA120412-LC	2	2.4	1.2	12.7	4.76	5.16					○			
2QP-CNGA**-H	2QP-CNGA120404-H	2	2.3	0.4	12.7	4.76	5.16						○		
	2QP-CNGA120408-H	2	2.2	0.8	12.7	4.76	5.16						○		
	2QP-CNGA120412-H	2	2.4	1.2	12.7	4.76	5.16						○		
2QP-CNGA**WL	2QP-CNGA120404WL	2	2.3	0.4	12.7	4.76	5.16							○	
	2QP-CNGA120408WL	2	2.2	0.8	12.7	4.76	5.16							○	
	2QP-CNGA120412WL	2	2.4	1.2	12.7	4.76	5.16							○	
2QP-CNMA**W	2QP-CNMA120404W	2	2.3	0.4	12.7	4.76	5.16							○	
	2QP-CNMA120408W	2	2.2	0.8	12.7	4.76	5.16							○	
	2QP-CNMA120412W	2	2.4	1.2	12.7	4.76	5.16							○	

*Please see the page B199 about the toolholders recommended for wiper inserts of the designation with W, WL, and WJ at the end.

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



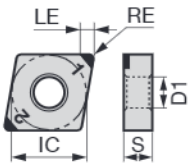
S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BXC50	BX360	BXC90
P	Steel						
M	Stainless						
K	Cast iron					◐	◐
N	Non-ferrous						
S	Superalloy						
H	Hard material	●	◐	◐	✣	◐	
	Sintered metal						



Shape	Designation	No. of corners	LE	RE	IC	S	D1	Honing: Standard	Honing: Sharp edge	Honing: L	Honing: LF	Honing: LC	Honing: H	Wiper	Chipbreaker
2QP-CNGM**-H*	2QP-CNGM120408-HF	2	2.2	0.8	12.7	4.76	5.16								○
	2QP-CNGM120412-HF	2	2.4	1.2	12.7	4.76	5.16								○
	2QP-CNGM120408-HM	2	2.2	0.8	12.7	4.76	5.16								○
	2QP-CNGM120412-HM	2	2.4	1.2	12.7	4.76	5.16								○
	2QP-CNGM120404-HP	2	2.3	0.4	12.7	4.76	5.16								○
	2QP-CNGM120408-HP	2	2.2	0.8	12.7	4.76	5.16								○
	2QP-CNGM120412-HP	2	2.4	1.2	12.7	4.76	5.16								○
2QP-CNGM**WL-HP	2QP-CNGM120408WL-HP	2	2.2	0.8	12.7	4.76	5.16							○	○
4QP-CNGA	4QP-CNGA120404	4	2.3	0.4	12.7	4.76	5.16	○							
	4QP-CNGA120408	4	2.2	0.8	12.7	4.76	5.16	○							
	4QP-CNGA120412	4	2.4	1.2	12.7	4.76	5.16	○							
4QP-CNMA**W	4QP-CNMA120404W	4	2.3	0.4	12.7	4.76	5.16							○	
	4QP-CNMA120408W	4	2.2	0.8	12.7	4.76	5.16							○	
	4QP-CNMA120412W	4	2.4	1.2	12.7	4.76	5.16							○	
4QS-CNGA	4QS-CNGA120408	4	2.2	0.8	12.7	4.76	5.16	○							
	4QS-CNGA120412	4	2.4	1.2	12.7	4.76	5.16	○							
4QS-CNGA**-H	4QS-CNGA120408-H	4	1.5	0.8	12.7	4.76	5.16						○		
	4QS-CNGA120412-H	4	1.7	1.2	12.7	4.76	5.16						○		
4QS-CNGG**-HM	4QS-CNGG120408-HM	4	1.5	0.8	12.7	4.76	5.16								○
	4QS-CNGG120412-HM	4	1.7	1.2	12.7	4.76	5.16								○
CNGA**-QBN	CNGA120402-QBN	1	4.1	0.2	12.7	4.76	5.16	○							
	CNGA120404-QBN	1	4.0	0.4	12.7	4.76	5.16	○							
	CNGA120408-QBN	1	3.9	0.8	12.7	4.76	5.16	○							
	CNGA120412-QBN	1	3.9	1.2	12.7	4.76	5.16	○							
S-CNGN	S-CNGN090308	4	-	0.8	9.525	3.18	-	○							
	S-CNGN090312	4	-	1.2	9.525	3.18	-	○							
	S-CNGN120408	4	-	0.8	12.7	4.76	-	○							
	S-CNGN120412	4	-	1.2	12.7	4.76	-	○							

*Please see the page B199 about the toolholders recommended for wiper inserts of the designation with W, WL, and WJ at the end.

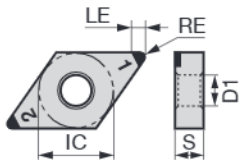
● : Line up

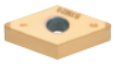
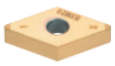
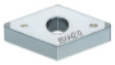
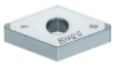
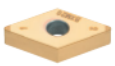
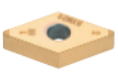
Reference pages: External toolholder → C018 - Internal toolholder → D023 -
J-Series toolholder → G044 TungCap → K008 -
PINZBOHR® → K180 - Cartridge → K199 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX380	BX470	BX480	BX930
P	Steel										
M	Stainless										
K	Cast iron								◐	✠	◐
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐	◐	●	◐	◐	✠			
	Sintered metal								◐	◐	✠



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing: Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-DNGA	2QP-DNGA110404	2	2.5	0.4	9.525	4.76	3.81	○							
	2QP-DNGA110408	2	2.1	0.8	9.525	4.76	3.81	○							
	2QP-DNGA110412	2	2.0	1.2	9.525	4.76	3.81	○							
	2QP-DNGA150404	2	2.5	0.4	12.7	4.76	5.16	○							
	2QP-DNGA150408	2	2.1	0.8	12.7	4.76	5.16	○							
	2QP-DNGA150412	2	2.0	1.2	12.7	4.76	5.16	○							
	2QP-DNGA150416	2	3.4	1.6	12.7	4.76	5.16	○							
	2QP-DNGA150420	2	3.0	2.0	12.7	4.76	5.16	○							
	2QP-DNGA150424	2	2.6	2.4	12.7	4.76	5.16	○							
	2QP-DNGA150604	2	2.5	0.4	12.7	6.35	5.16	○							
	2QP-DNGA150608	2	2.1	0.8	12.7	6.35	5.16	○							
	2QP-DNGA150612	2	2.0	1.2	12.7	6.35	5.16	○							
2QP-DNGA**-L	2QP-DNGA150404-L	2	2.5	0.4	12.7	4.76	5.16			○					
	2QP-DNGA150408-L	2	2.1	0.8	12.7	4.76	5.16			○					
	2QP-DNGA150412-L	2	2.0	1.2	12.7	4.76	5.16			○					
	2QP-DNGA150604-L	2	2.5	0.4	12.7	6.35	5.16			○					
	2QP-DNGA150608-L	2	2.1	0.8	12.7	6.35	5.16			○					
	2QP-DNGA150612-L	2	2.0	1.2	12.7	6.35	5.16			○					
2QP-DNGA**-LF	2QP-DNGA150404-LF	2	2.5	0.4	12.7	4.76	5.16				○				
	2QP-DNGA150408-LF	2	2.1	0.8	12.7	4.76	5.16				○				
	2QP-DNGA150412-LF	2	2.0	1.2	12.7	4.76	5.16				○				
	2QP-DNGA150604-LF	2	2.5	0.4	12.7	6.35	5.16				○				
	2QP-DNGA150608-LF	2	2.1	0.8	12.7	6.35	5.16				○				
	2QP-DNGA150612-LF	2	2.0	1.2	12.7	6.35	5.16				○				
2QP-DNGA**-LC	2QP-DNGA150404-LC	2	2.5	0.4	12.7	4.76	5.16					○			
	2QP-DNGA150408-LC	2	2.1	0.8	12.7	4.76	5.16					○			
	2QP-DNGA150412-LC	2	2.0	1.2	12.7	4.76	5.16					○			
	2QP-DNGA150604-LC	2	2.5	0.4	12.7	6.35	5.16					○			
	2QP-DNGA150608-LC	2	2.1	0.8	12.7	6.35	5.16					○			
	2QP-DNGA150612-LC	2	2.0	1.2	12.7	6.35	5.16					○			
2QP-DNGA**-H	2QP-DNGA150404-H	2	2.5	0.4	12.7	4.76	5.16						○		
	2QP-DNGA150408-H	2	2.1	0.8	12.7	4.76	5.16						○		
	2QP-DNGA150412-H	2	2.0	1.2	12.7	4.76	5.16						○		
	2QP-DNGA150604-H	2	2.5	0.4	12.7	6.35	5.16						○		
	2QP-DNGA150608-H	2	2.1	0.8	12.7	6.35	5.16						○		
	2QP-DNGA150612-H	2	2.0	1.2	12.7	6.35	5.16						○		
2QP-DNGA**WJ	2QP-DNGA150404WJ	2	2.5	0.4	12.7	4.76	5.16							○	
	2QP-DNGA150408WJ	2	2.1	0.8	12.7	4.76	5.16							○	
															

*Please see the page B199 about the toolholders recommended for wiper inserts of the designation with W, WL, and WJ at the end.

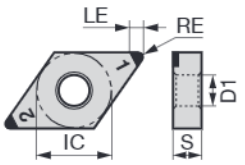
● : Line up

Reference pages: External toolholder → C042 - Internal toolholder → D052 -
J-Series toolholder → G046 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BXC50	BX360
P	Steel					
M	Stainless					
K	Cast iron					
N	Non-ferrous					
S	Superalloy					
H	Hard material	●	◐	◐	✠	◐
	Sintered metal					

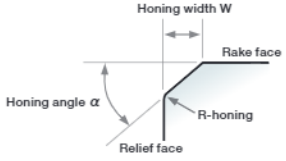


Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-DNGM-H***	**2QP-DNGM150408-HF**	2	2.1	0.8	12.7	4.76	5.16								○
	2QP-DNGM150412-HF	2	2.0	1.2	12.7	4.76	5.16								○
	2QP-DNGM150408-HM	2	2.1	0.8	12.7	4.76	5.16								○
	2QP-DNGM150412-HM	2	2.0	1.2	12.7	4.76	5.16								○
	2QP-DNGM150404-HP	2	2.5	0.4	12.7	4.76	5.16								○
	2QP-DNGM150408-HP	2	2.1	0.8	12.7	4.76	5.16								○
	2QP-DNGM150608-HP	2	2.1	0.8	12.7	6.35	5.16								○
4QP-DNGA	**4QP-DNGA150404**	4	2.5	0.4	12.7	4.76	5.16	○							
	4QP-DNGA150408	4	2.1	0.8	12.7	4.76	5.16	○							
	4QP-DNGA150412	4	2.0	1.2	12.7	4.76	5.16	○							
4QS-DNGA	**4QS-DNGA150408**	4	2.1	0.8	12.7	4.76	5.16	○							
	4QS-DNGA150412	4	2.0	1.2	12.7	4.76	5.16	○							
4QS-DNGA-H**	**4QS-DNGA150408-H**	4	1.6	0.8	12.7	4.76	5.16						○		
	4QS-DNGA150412-H	4	1.6	1.2	12.7	4.76	5.16						○		
4QS-DNGG-HM**	**4QS-DNGG150408-HM**	4	1.6	0.8	12.7	4.76	5.16								○
DNGA-QBN**	**DNGA150402-QBN**	1	4.3	0.2	12.7	4.76	5.16	○							
	DNGA150404-QBN	1	4.1	0.4	12.7	4.76	5.16	○							
	DNGA150408-QBN	1	3.8	0.8	12.7	4.76	5.16	○							
	DNGA150412-QBN	1	3.4	1.2	12.7	4.76	5.16	○							

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

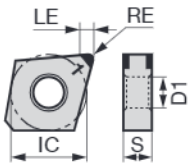
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: Internal toolholder → D052 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

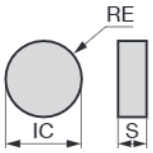
		BXM10	BXM20	BXA20	BXB60	BX470	BX930
P	Steel						
M	Stainless						
K	Cast iron					◐	◐
N	Non-ferrous						
S	Superalloy						
H	Hard material	●	◐	◐	◐	◐	
	Sintered metal					◐	



Shape	Designation	No. of corners	LE	RE	IC	S	D1	Honing: Standard	Honing: Sharp edge	Honing: L	Honing: LF	Honing: LC	Honing: H	Wiper	Chipbreaker
2QP-GNGA (Corner angle 70°)	*2QP-GNGA120404	2	2.1	0.4	12.7	4.76	5.16	○							
	*2QP-GNGA120408	2	2.1	0.8	12.7	4.76	5.16	○							
	*2QP-GNGA120412	2	2.2	1.2	12.7	4.76	5.16	○							
2QP-GNGA**-L	*2QP-GNGA120404-L	2	2.1	0.4	12.7	4.76	5.16			○					
	*2QP-GNGA120408-L	2	2.1	0.8	12.7	4.76	5.16			○					
	*2QP-GNGA120412-L	2	2.2	1.2	12.7	4.76	5.16			○					
2QP-GNGA**-LF	*2QP-GNGA120404-LF	2	2.1	0.4	12.7	4.76	5.16				○				
	*2QP-GNGA120408-LF	2	2.1	0.8	12.7	4.76	5.16				○				
	*2QP-GNGA120412-LF	2	2.2	1.2	12.7	4.76	5.16				○				
2QP-GNGA**-LC	*2QP-GNGA120404-LC	2	2.1	0.4	12.7	4.76	5.16					○			
	*2QP-GNGA120408-LC	2	2.1	0.8	12.7	4.76	5.16					○			
	*2QP-GNGA120412-LC	2	2.2	1.2	12.7	4.76	5.16					○			
2QP-GNGA**-H	*2QP-GNGA120404-H	2	2.1	0.4	12.7	4.76	5.16						○		
	*2QP-GNGA120408-H	2	2.1	0.8	12.7	4.76	5.16						○		
	*2QP-GNGA120412-H	2	2.2	1.2	12.7	4.76	5.16						○		
2QP-GNGG**-HP (Corner angle 70°)	*2QP-GNGG120404-HP	2	2.1	0.4	12.7	4.76	5.16								○
	*2QP-GNGG120408-HP	2	2.1	0.8	12.7	4.76	5.16								○
	*2QP-GNGG120412-HP	2	2.2	1.2	12.7	4.76	5.16								○

* Tungaloy's standard

		BXC90
P	Steel	
M	Stainless	
K	Cast iron	◐
N	Non-ferrous	
S	Superalloy	
H	Hard material	

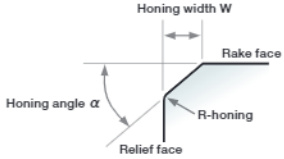


Shape	Designation	No. of corners	LE	RE	IC	S	D1	Honing: Standard	Honing: Sharp edge	Honing: L	Honing: LF	Honing: LC	Honing: H	Wiper	Chipbreaker
S-RNGN	S-RNGN090300	-	-	-	9.525	3.18	-	○							
	S-RNGN120400	-	-	-	12.7	4.76	-	○							

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



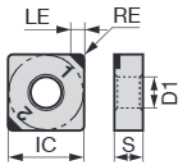
S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM20	BXA20	BXC50	BX310	BX330	BX360	BX380	BX480	BX910	BX930	BXC90
P	Steel								✠	●	◐●	◐●
M	Stainless											
K	Cast iron								✠	●	◐●	◐●
N	Non-ferrous											
S	Superalloy											
H	Hard material	◐●	◐●	✠	●	◐●	◐●	✠				
	Sintered metal								◐✠			



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-SNGA	2QP-SNGA120404	2	2.4	0.4	12.7	4.76	5.16	○							
	2QP-SNGA120408	2	2.4	0.8	12.7	4.76	5.16	○							
	2QP-SNGA120412	2	2.4	1.2	12.7	4.76	5.16	○							
2QP-SNGA-L**	2QP-SNGA120404-L	2	2.4	0.4	12.7	4.76	5.16			○					
	2QP-SNGA120408-L	2	2.4	0.8	12.7	4.76	5.16			○					
	2QP-SNGA120412-L	2	2.4	1.2	12.7	4.76	5.16			○					
2QP-SNGA-LF**	2QP-SNGA120408-LF	2	2.4	0.8	12.7	4.76	5.16				○				
	2QP-SNGA120412-LF	2	2.4	1.2	12.7	4.76	5.16				○				
2QP-SNGA-H**	2QP-SNGA120404-H	2	2.4	0.4	12.7	4.76	5.16						○		
	2QP-SNGA120408-H	2	2.4	0.8	12.7	4.76	5.16						○		
	2QP-SNGA120412-H	2	2.4	1.2	12.7	4.76	5.16						○		
4QP-SNGA	4QP-SNGA120404	4	2.4	0.4	12.7	4.76	5.16	○							
	4QP-SNGA120408	4	2.4	0.8	12.7	4.76	5.16	○							
	4QP-SNGA120412	4	2.4	1.2	12.7	4.76	5.16	○							
SNGA-QBN**	SNGA120402-QBN	1	4.1	0.2	12.7	4.76	5.16	○							
	SNGA120404-QBN	1	4.1	0.4	12.7	4.76	5.16	○							
	SNGA120408-QBN	1	4.1	0.8	12.7	4.76	5.16	○							
	SNGA120412-QBN	1	4.1	1.2	12.7	4.76	5.16	○							
2QP-SNGN	2QP-SNGN090308	2	2.4	0.8	9.525	3.18	-	○							
	2QP-SNGN090312	2	2.4	1.2	9.525	3.18	-	○							
S-SNGN	S-SNGN090308	8	-	0.8	9.525	3.18	-	○							
	S-SNGN090312	8	-	1.2	9.525	3.18	-	○							
	S-SNGN120308	8	-	0.8	12.7	3.18	-	○							
	S-SNGN120312	8	-	1.2	12.7	3.18	-	○							
	S-SNGN120408	8	-	0.8	12.7	4.76	-	○							
	S-SNGN120412	8	-	1.2	12.7	4.76	-	○							

● : Line up

Reference pages: External toolholder → C093 - Internal toolholder → D040 -
Cartridge → K197 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX380	BX470	BX480	BX930
P	Steel								◐	✣	◐
M	Stainless								◐	◐	✣
K	Cast iron								◐	✣	◐
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐	◐	●	◐	◐	✣			
	Sintered metal								◐	◐	✣

Shape	Designation	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
3QP-TNGA	3QP-TNGA160404	3	2.2	0.4	9.525	4.76	3.81	○							
	3QP-TNGA160408	3	1.9	0.8	9.525	4.76	3.81	○							
	3QP-TNGA160412	3	2.4	1.2	9.525	4.76	3.81	○							
	3QP-TNGA160416	3	3.3	1.6	9.525	4.76	3.81	○							
	3QP-TNGA160420	3	3.0	2.0	9.525	4.76	3.81	○							
	3QP-TNGA160424	3	2.7	2.4	9.525	4.76	3.81	○							
T3QP-TNGA	T3QP-TNGA160404	3	2.2	0.4	9.525	4.76	3.81	○							
	T3QP-TNGA160408	3	1.9	0.8	9.525	4.76	3.81	○							
3QP-TNGA**F	3QP-TNGA160404F	3	2.2	0.4	9.525	4.76	3.81		○						
	3QP-TNGA160408F	3	1.9	0.8	9.525	4.76	3.81		○						
3QP-TNGA**-L	3QP-TNGA160404-L	3	2.2	0.4	9.525	4.76	3.81			○					
	3QP-TNGA160408-L	3	1.9	0.8	9.525	4.76	3.81			○					
	3QP-TNGA160412-L	3	2.4	1.2	9.525	4.76	3.81			○					
3QP-TNGA**-LF	3QP-TNGA160404-LF	3	2.2	0.4	9.525	4.76	3.81				○				
	3QP-TNGA160408-LF	3	1.9	0.8	9.525	4.76	3.81				○				
	3QP-TNGA160412-LF	3	2.4	1.2	9.525	4.76	3.81				○				
3QP-TNGA**-LC	3QP-TNGA160404-LC	3	2.2	0.4	9.525	4.76	3.81					○			
	3QP-TNGA160408-LC	3	1.9	0.8	9.525	4.76	3.81					○			
	3QP-TNGA160412-LC	3	2.4	1.2	9.525	4.76	3.81					○			
3QP-TNGA**-H	3QP-TNGA160404-H	3	2.2	0.4	9.525	4.76	3.81						○		
	3QP-TNGA160408-H	3	1.9	0.8	9.525	4.76	3.81						○		
	3QP-TNGA160412-H	3	2.4	1.2	9.525	4.76	3.81						○		
3QP-TNGA**WG	3QP-TNGA160404WG	3	2.2	0.4	9.525	4.76	3.81							○	
	3QP-TNGA160408WG	3	1.9	0.8	9.525	4.76	3.81							○	
3QP-TNGM**-H*	3QP-TNGM160408-HF	3	1.9	0.8	9.525	4.76	3.81								○
	3QP-TNGM160412-HF	3	2.4	1.2	9.525	4.76	3.81								○
	3QP-TNGM160408-HM	3	1.9	0.8	9.525	4.76	3.81								○
	3QP-TNGM160412-HM	3	2.2	1.2	9.525	4.76	3.81								○
	3QP-TNGM160404-HP	3	2.2	0.4	9.525	4.76	3.81								○
	3QP-TNGM160408-HP	3	1.9	0.8	9.525	4.76	3.81								○

*T at the beginning of the designation means 10 pieces per package.
Please see the page B199 about the toolholders recommended for wiper inserts of the designation with WG at the end.

● : Line up

Reference pages: External toolholder → C115 -
J-Series toolholder → G047 -
Cartridge → K193 -
Internal toolholder → D046 -
TungCap → K014 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

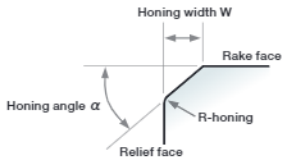
		BXA20	BXC50	BX360	BXC90
P	Steel				
M	Stainless				
K	Cast iron				●◐
N	Non-ferrous				
S	Superalloy				
H	Hard material	●◐	✠	●◐	
	Sintered metal				

Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
6QP-TNGA	**6QP-TNGA160404**	6	2.2	0.4	9.525	4.76	3.81	○							
	6QP-TNGA160408	6	1.9	0.8	9.525	4.76	3.81	○							
	6QP-TNGA160412	6	2.4	1.2	9.525	4.76	3.81	○							
6QS-TNGA	**6QS-TNGA160408**	6	1.9	0.8	9.525	4.76	3.81	○							
	6QS-TNGA160412	6	2.4	1.2	9.525	4.76	3.81	○							
6QS-TNGA-H**	**6QS-TNGA160408-H**	6	1.6	0.8	9.525	4.76	3.81						○		
	6QS-TNGA160412-H	6	1.8	1.2	9.525	4.76	3.81						○		
6QS-TNGG-HM**	**6QS-TNGG160408-HM**	6	1.6	0.8	9.525	4.76	3.81								○
	6QS-TNGG160412-HM	6	1.8	1.2	9.525	4.76	3.81								○
TNGA-QBN**	**TNGA160402-QBN**	1	4.4	0.2	9.525	4.76	3.81	○							
	TNGA160404-QBN	1	4.2	0.4	9.525	4.76	3.81	○							
	TNGA160408-QBN	1	4.0	0.8	9.525	4.76	3.81	○							
	TNGA160412-QBN	1	3.7	1.2	9.525	4.76	3.81	○							
S-TNGN	**S-TNGN110308**	6	-	0.8	6.35	3.18	-	○							
	S-TNGN110312	6	-	1.2	6.35	3.18	-	○							
	S-TNGN160408	6	-	0.8	9.525	4.76	-	○							
	S-TNGN160412	6	-	1.2	9.525	4.76	-	○							

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

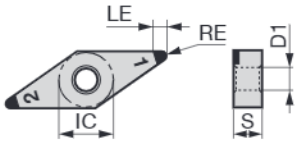
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: External toolholder → C115 - Internal toolholder → D046 -
J-Series toolholder → G047 - TungCap → K014 -
Cartridge → K193 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BXC50	BX310	BX330	BX360	BX380	BX470	BX480	BX930
P	Steel											
M	Stainless											
K	Cast iron									●◐	✠	●◐
N	Non-ferrous											
S	Superalloy											
H	Hard material	●	●◐	●◐	✠	●	●◐	●◐	✠			
	Sintered metal									●◐	◐✠	



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing: Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-VNGA	2QP-VNGA160404	2	3.1	0.4	9.525	4.76	3.81	○							
	2QP-VNGA160408	2	2.2	0.8	9.525	4.76	3.81	○							
	2QP-VNGA160412	2	3.0	1.2	9.525	4.76	3.81	○							
2QP-VNGA**-L	2QP-VNGA160404-L	2	3.1	0.4	9.525	4.76	3.81			○					
	2QP-VNGA160408-L	2	2.2	0.8	9.525	4.76	3.81			○					
	2QP-VNGA160412-L	2	3.0	1.2	9.525	4.76	3.81			○					
2QP-VNGA**-LF	2QP-VNGA160404-LF	2	3.1	0.4	9.525	4.76	3.81				○				
	2QP-VNGA160408-LF	2	2.2	0.8	9.525	4.76	3.81				○				
	2QP-VNGA160412-LF	2	3.0	1.2	9.525	4.76	3.81				○				
2QP-VNGA**-LC	2QP-VNGA160404-LC	2	3.1	0.4	9.525	4.76	3.81					○			
	2QP-VNGA160408-LC	2	2.2	0.8	9.525	4.76	3.81					○			
	2QP-VNGA160412-LC	2	3.0	1.2	9.525	4.76	3.81					○			
2QP-VNGA**-H	2QP-VNGA160404-H	2	3.1	0.4	9.525	4.76	3.81						○		
	2QP-VNGA160408-H	2	2.2	0.8	9.525	4.76	3.81						○		
	2QP-VNGA160412-H	2	3.0	1.2	9.525	4.76	3.81						○		
2QP-VNGM**-H*	2QP-VNGM160408-HF	2	2.2	0.8	9.525	4.76	3.81								○
	2QP-VNGM160408-HM	2	2.4	0.8	9.525	4.76	3.81								○
	2QP-VNGM160408-HP	2	2.2	0.8	9.525	4.76	3.81								○
4QP-VNGA	4QP-VNGA160404	4	3.1	0.4	9.525	4.76	3.81	○							
	4QP-VNGA160408	4	2.2	0.8	9.525	4.76	3.81	○							
4QS-VNGA	4QS-VNGA160408	4	1.7	0.8	9.525	4.76	3.81	○							
4QS-VNGA**-H	4QS-VNGA160408-H	4	1.7	0.8	9.525	4.76	3.81						○		
4QS-VNGG**-HM	4QS-VNGG160408-HM	4	1.7	0.8	9.525	4.76	3.81								○

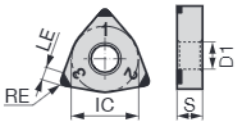
● : Line up

Reference pages: External toolholder → C059 - Internal toolholder → D070 -
TungCap → K015 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BXC50	BX310	BX330	BX360	BX380	BX480	BX930
P	Steel										
M	Stainless										
K	Cast iron									✠	◐✠
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐✠	◐✠	✠	●	◐✠	◐✠	✠		
	Sintered metal									◐✠	



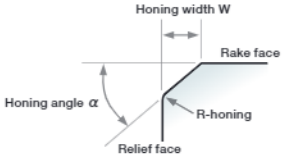
Shape	Designation	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	CL	H	Wiper	Chipbreaker
3QP-WNGA	3QP-WNGA080404	3	2.3	0.4	12.7	4.76	5.16	○							
	3QP-WNGA080408	3	2.2	0.8	12.7	4.76	5.16	○							
	3QP-WNGA080412	3	2.4	1.2	12.7	4.76	5.16	○							
3QP-WNGA**-L	3QP-WNGA080408-L	3	2.2	0.8	12.7	4.76	5.16			○					
3QP-WNGA**-LF	3QP-WNGA080408-LF	3	2.2	0.8	12.7	4.76	5.16				○				
3QP-WNGA**-H	3QP-WNGA080408-H	3	2.2	0.8	12.7	4.76	5.16						○		
3QP-WNGA**WL	3QP-WNGA080408WL	3	2.2	0.8	12.7	4.76	5.16	○						○	
6QP-WNGA	6QP-WNGA080404	6	2.3	0.4	12.7	4.76	5.16	○							
	6QP-WNGA080408	6	2.2	0.8	12.7	4.76	5.16	○							
6QS-WNGA	6QS-WNGA080408	6	1.5	0.8	12.7	4.76	5.16	○							
6QS-WNGA**-H	6QS-WNGA080408-H	6	1.5	0.8	12.7	4.76	5.16						○		

*Please see the page B199 about the toolholders recommended for wiper inserts of the designation with WL at the end.

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

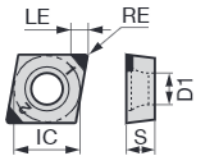
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: External toolholder → C034 - Internal toolholder → D031 -
TungCap → C035 -, K011 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX930
P	Steel									
M	Stainless									
K	Cast iron							●◐	✣	●◐
N	Non-ferrous									
S	Superalloy							●◐		
H	Hard material	●	●◐	●◐	●	●◐	●◐			
	Sintered metal							●◐	◐✣	



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing: Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-CCGW	2QP-CCGW060202	2	2.3	0.2	6.35	2.38	2.8	○							
	2QP-CCGW060204	2	2.3	0.4	6.35	2.38	2.8	○							
	2QP-CCGW060208	2	2.2	0.8	6.35	2.38	2.8	○							
	2QP-CCGW09T304	2	2.3	0.4	9.525	3.97	4.4	○							
	2QP-CCGW09T308	2	2.2	0.8	9.525	3.97	4.4	○							
2QP-CCGW**-L	2QP-CCGW060204-L	2	2.3	0.4	6.35	2.38	2.8			○					
	2QP-CCGW060208-L	2	2.2	0.8	6.35	2.38	2.8			○					
	2QP-CCGW09T304-L	2	2.3	0.4	9.525	3.97	4.4			○					
	2QP-CCGW09T308-L	2	2.2	0.8	9.525	3.97	4.4			○					
2QP-CCGW**-LF	2QP-CCGW060204-LF	2	2.3	0.4	6.35	2.38	2.8				○				
	2QP-CCGW060208-LF	2	2.2	0.8	6.35	2.38	2.8				○				
	2QP-CCGW09T304-LF	2	2.3	0.4	9.525	3.97	4.4				○				
	2QP-CCGW09T308-LF	2	2.2	0.8	9.525	3.97	4.4				○				
2QP-CCGW**-LC	2QP-CCGW060204-LC	2	2.3	0.4	6.35	2.38	2.8					○			
	2QP-CCGW060208-LC	2	2.2	0.8	6.35	2.38	2.8					○			
	2QP-CCGW09T304-LC	2	2.3	0.4	9.525	3.97	4.4					○			
	2QP-CCGW09T308-LC	2	2.2	0.8	9.525	3.97	4.4					○			
2QP-CCGW**-H	2QP-CCGW09T304-H	2	2.3	0.4	9.525	3.97	4.4						○		
	2QP-CCGW09T308-H	2	2.2	0.8	9.525	3.97	4.4						○		
2QP-CCGW**WL	2QP-CCGW09T304WL	2	2.3	0.4	9.525	3.97	4.4	○						○	
	2QP-CCGW09T308WL	2	2.2	0.8	9.525	3.97	4.4	○						○	
2QP-CCGT**-HP	2QP-CCGT060204-HP	2	2.3	0.4	6.35	2.38	2.8								○
	2QP-CCGT09T304-HP	2	2.3	0.4	9.525	3.97	4.4								○
	2QP-CCGT09T308-HP	2	2.2	0.8	9.525	3.97	4.4								○
2QP-CCGT**WL-HP	2QP-CCGT09T304WL-HP	2	2.3	0.4	9.525	3.97	4.4							○	○
	2QP-CCGT09T308WL-HP	2	2.2	0.8	9.525	3.97	4.4							○	○

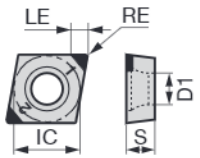
● : Line up

Reference pages: External toolholder → C024 - Internal toolholder → D014 -
J-Series toolholder → G019 - PINZBOHR® → K180 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
ⓒ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX930
P	Steel									
M	Stainless									
K	Cast iron							●ⓒ	✣	●ⓒ
N	Non-ferrous									
S	Superalloy									
H	Hard material	●	●ⓒ	●ⓒ	●	●ⓒ	●ⓒ			
	Sintered metal							●ⓒ	✣	



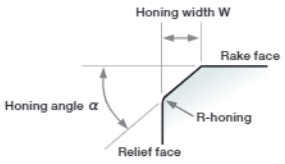
Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-CCMW	2QP-CCMW060202	2	2.3	0.2	6.35	2.38	2.8	○							
	2QP-CCMW060204	2	2.3	0.4	6.35	2.38	2.8	○							
	2QP-CCMW09T304	2	2.3	0.4	9.525	3.97	4.4	○							
	2QP-CCMW09T308	2	2.2	0.8	9.525	3.97	4.4	○							
Q-CCMW	Q-CCMW060204	1	2.5	0.4	6.35	2.38	2.8	○							
	Q-CCMW09T304	1	2.5	0.4	9.525	3.97	4.4	○							
1QP-CCGW	1QP-CCGW03X102	1	1.4	0.2	3.57	1.39	1.9	○							
	1QP-CCGW03X104	1	1.3	0.4	3.57	1.39	1.9	○							
	1QP-CCGW04T102	1	1.9	0.2	4.37	1.79	2.3	○							
	1QP-CCGW04T104	1	1.8	0.4	4.37	1.79	2.3	○							
2QP-CPGW	2QP-CPGW080204	2	2.3	0.4	7.94	2.38	3.4	○							
	2QP-CPGW080208	2	2.2	0.8	7.94	2.38	3.4	○							
	2QP-CPGW090304	2	2.3	0.4	9.525	3.18	4.4	○							
	2QP-CPGW090308	2	2.2	0.8	9.525	3.18	4.4	○							
CPGA-QBN**	CPGA090204-QBN	1	4.0	0.4	9.525	2.38	4.0	○							
	CPGA090208-QBN	1	3.8	0.8	9.525	2.38	4.0	○							

Q-CCMW: 2 pieces per package

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

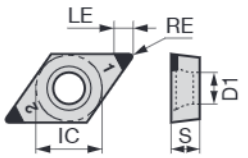
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: External toolholder → C024 - Internal toolholder → D014 -
J-Series toolholder → G019 - PINZBOHR® → K180 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX930
P	Steel									
M	Stainless									
K	Cast iron							◐	✣	◐
N	Non-ferrous									
S	Superalloy									
H	Hard material	●	◐	◐	●	◐	◐			
	Sintered metal							◐	◐	✣



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing: Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-DCGW	2QP-DCGW070202	2	2.7	0.2	6.35	2.38	2.8	○							
	2QP-DCGW070204	2	2.5	0.4	6.35	2.38	2.8	○							
	2QP-DCGW070208	2	2.5	0.8	6.35	2.38	2.8	○							
	2QP-DCGW11T302	2	2.7	0.2	9.525	3.97	4.4	○							
	2QP-DCGW11T304	2	2.5	0.4	9.525	3.97	4.4	○							
	2QP-DCGW11T308	2	2.1	0.8	9.525	3.97	4.4	○							
2QP-DCGW**-L	2QP-DCGW070204-L	2	2.5	0.4	6.35	2.38	2.8			○					
	2QP-DCGW070208-L	2	2.5	0.8	6.35	2.38	2.8			○					
	2QP-DCGW11T304-L	2	2.5	0.4	9.525	3.97	4.4			○					
	2QP-DCGW11T308-L	2	2.1	0.8	9.525	3.97	4.4			○					
2QP-DCGW**-LF	2QP-DCGW070204-LF	2	2.5	0.4	6.35	2.38	2.8				○				
	2QP-DCGW070208-LF	2	2.5	0.8	6.35	2.38	2.8				○				
	2QP-DCGW11T304-LF	2	2.5	0.4	9.525	3.97	4.4				○				
	2QP-DCGW11T308-LF	2	2.1	0.8	9.525	3.97	4.4				○				
2QP-DCGW**-LC	2QP-DCGW070204-LC	2	2.5	0.4	6.35	2.38	2.8					○			
	2QP-DCGW070208-LC	2	2.5	0.8	6.35	2.38	2.8					○			
	2QP-DCGW11T304-LC	2	2.5	0.4	9.525	3.97	4.4					○			
	2QP-DCGW11T308-LC	2	2.1	0.8	9.525	3.97	4.4					○			
2QP-DCGW**-H	2QP-DCGW11T304-H	2	2.5	0.4	9.525	3.97	4.4						○		
	2QP-DCGW11T308-H	2	2.1	0.8	9.525	3.97	4.4						○		
2QP-DCGT**-HP	2QP-DCGT070204-HP	2	2.5	0.4	6.35	2.38	2.8								○
	2QP-DCGT11T304-HP	2	2.5	0.4	9.525	3.97	4.4								○
	2QP-DCGT11T308-HP	2	2.1	0.8	9.525	3.97	4.4								○

● : Line up

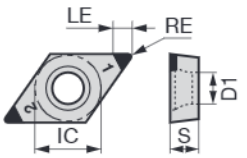
Reference pages: External toolholder → C048 - Internal toolholder → D048 -
J-Series toolholder → G026 - PINZBOHR® → K184 -

CBN Insert POSITIVE TYPE

●: Continuous cutting
◐: Light interrupted cutting
✠: Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX930				Dimension (mm)						Honing						Wiper	Chipbreaker
Shape	Designation													No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H		
2QP-DCMW	2QP-DCMW070202				●	●	●							2	2.7	0.2	6.35	2.38	2.8	○							
	2QP-DCMW070204				●	●	●			●				2	2.5	0.4	6.35	2.38	2.8	○							
	2QP-DCMW11T302				●	●	●							2	2.7	0.2	9.525	3.97	4.4	○							
	2QP-DCMW11T304				●	●	●			●				2	2.5	0.4	9.525	3.97	4.4	○							
	2QP-DCMW11T308				●	●	●							2	2.1	0.8	9.525	3.97	4.4	○							
2QP-DCGWF**	2QP-DCGW11T302F							●						2	2.7	0.2	9.525	3.97	4.4		○						
	2QP-DCGW11T304F							●						2	2.5	0.4	9.525	3.97	4.4		○						
Q-DCMW	Q-DCMW070204					●								1	2.1	0.4	6.35	2.38	2.8	○							
	Q-DCMW11T304					●								1	2.1	0.4	9.525	3.97	4.4	○							

P	Steel										
M	Stainless										
K	Cast iron						●◐	✠	●◐		
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	●◐	●◐	●	●◐	●◐				
	Sintered metal						●◐	✠			

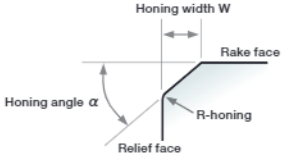


Q-DCMW: 2 pieces per package

●: Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

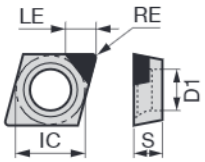
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

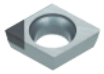
Reference pages: External toolholder → C048 - Internal toolholder → D048 -
J-Series toolholder → G026 - PINZBOHR® → K184 -

CBN Insert POSITIVE TYPE

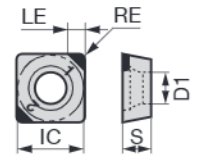
● : Continuous cutting
ⓒ : Light interrupted cutting
✠ : Heavy interrupted cutting

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material
	Sintered metal



Shape	Designation	BX310	BX470	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
					Dimension (mm)					Honing							
1QP-EPGW	1QP-EPGW03X102	●	●	1	1.4	0.2	3.57	1.39	1.9	○							
	1QP-EPGW03X104	●	●	1	1.3	0.4	3.57	1.39	1.9	○							
	1QP-EPGW040102	●	●	1	1.7	0.2	3.97	1.59	2.3	○							
	1QP-EPGW040104	●	●	1	1.6	0.4	3.97	1.59	2.3	○							

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material
	Sintered metal



Shape	Designation	BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX910	BX930	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
													Dimension (mm)					Honing							
2QP-SPGN	2QP-SPGN090308									●		2	2.4	0.8	9.525	3.18	-	○							
	2QP-SPGN090312									●		2	2.4	1.2	9.525	3.18	-	○							
																									
2QP-SPMN	2QP-SPMN090304					●	●				●	2	2.4	0.4	9.525	3.18	-	○							
	2QP-SPMN090308					●	●				●	2	2.4	0.8	9.525	3.18	-	○							
																									
Q-SPGN	Q-SPGN090304					●						1	2.8	0.4	9.525	3.18	-	○							
	Q-SPGN090308					●						1	2.8	0.8	9.525	3.18	-	○							
																									
SPGN**-QBN	SPGN090304-QBN						●					1	4.1	0.4	9.525	3.18	-	○							
	SPGN090308-QBN						●					1	4.1	0.8	9.525	3.18	-	○							
	SPGN090312-QBN						●					1	4.1	1.2	9.525	3.18	-	○							
	SPGN120308-QBN						●					1	4.1	0.8	12.7	3.18	-	○							
	SPGN120312-QBN						●					1	4.1	1.2	12.7	3.18	-	○							
2QP-SPGW	2QP-SPGW09T308									●		2	2.4	0.8	9.525	3.97	4.4	○							
	2QP-SPGW09T312									●		2	2.4	1.2	9.525	3.97	4.4	○							
	2QP-SPGW120408									●		2	2.4	0.8	12.7	4.76	5.5	○							
	2QP-SPGW120412									●		2	2.4	1.2	12.7	4.76	5.5	○							
	2QP-SPGW120416									●		2	2.4	1.6	12.7	4.76	5.5	○							

Q-SPGN: 2 pieces per package

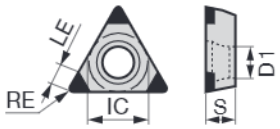
● : Line up

Reference pages: Internal toolholder → D033 - PINZBOHR® → K197 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX910	BX930		
P	Steel												
M	Stainless												
K	Cast iron							◐	✠	●	◐		
N	Non-ferrous												
S	Superalloy												
H	Hard material	●	◐	◐	●	◐	◐						
	Sintered metal							◐	✠				



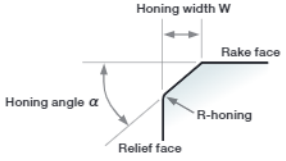
Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
3QP-TPGN	**3QP-TPGN110302**	3	2.3	0.2	6.35	3.18	-	○							
	3QP-TPGN110304	3	2.2	0.4	6.35	3.18	-	○							
	3QP-TPGN110308	3	2.2	0.8	6.35	3.18	-	○							
	3QP-TPGN110312	3	2.4	1.2	6.35	3.18	-	○							
	3QP-TPGN160304	3	2.2	0.4	9.525	4.76	-	○							
	3QP-TPGN160308	3	1.9	0.8	9.525	4.76	-	○							
3QP-TPMN	**3QP-TPMN110302**	3	2.3	0.2	6.35	3.18	-	○							
	3QP-TPMN110304	3	2.2	0.4	6.35	3.18	-	○							
	3QP-TPMN110308	3	1.9	0.8	6.35	3.18	-	○							
	3QP-TPMN160304	3	2.2	0.4	9.525	3.18	-	○							
	3QP-TPMN160308	3	1.9	0.8	9.525	3.18	-	○							
Q-TPGN	**Q-TPGN110304**	1	2.2	0.4	6.35	3.18	-	○							
	Q-TPGN110308	1	2.2	0.8	6.35	3.18	-	○							
	Q-TPGN160304	1	2.3	0.4	9.525	3.18	-	○							
	Q-TPGN160308	1	1.9	0.8	9.525	3.18	-	○							
TPGN-QBN**	**TPGN110304-QBN**	1	3.7	0.4	6.35	3.18	-	○							
	TPGN110308-QBN	1	3.5	0.8	6.35	3.18	-	○							
	TPGN160304-QBN	1	4.2	0.4	9.525	3.18	-	○							
	TPGN160308-QBN	1	4.0	0.8	9.525	3.18	-	○							
TBGN-QBN**	**TBGN060104-15-QBN**	3	-	0.4	3.97	1.59	-	○							
	TBGN060108-15-QBN	3	-	0.8	3.97	1.59	-	○							

Q-TPGN: 2 pieces per package

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

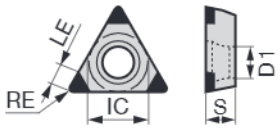
T --- Chamfered honing
S --- Chamfered + R-honing
E --- R-honing alone
F --- Sharp edge

Reference pages: Internal toolholder → D044 - Cartridge → K193 -
Boring bar tool → K209 - Top-borer tool → K213

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✣ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX910	BX930
P	Steel										
M	Stainless										
K	Cast iron							◐	✣	●	◐
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐	◐	●	◐	◐				
	Sintered metal							◐	✣		



Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing: Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
3QP-TPGW	3QP-TPGW080204	3	2.2	0.4	4.76	2.38	2.3	○							
	3QP-TPGW080208	3	2.2	0.8	4.76	2.38	2.3	○							
	3QP-TPGW090204	3	2.2	0.4	5.56	2.38	2.5	○							
	3QP-TPGW090208	3	2.2	0.8	5.56	2.38	2.5	○							
	3QP-TPGW110202	3	2.3	0.2	6.35	2.38	2.8	○							
	3QP-TPGW110204	3	2.2	0.4	6.35	2.38	2.8	○							
	3QP-TPGW110208	3	2.2	0.8	6.35	2.38	2.8	○							
	3QP-TPGW110302	3	2.3	0.2	6.35	3.18	3.4	○							
	3QP-TPGW110304	3	2.2	0.4	6.35	3.18	3.4	○							
	3QP-TPGW110308	3	2.2	0.8	6.35	3.18	3.4	○							
	3QP-TPGW130302	3	2.3	0.2	7.94	3.18	3.4	○							
	3QP-TPGW130304	3	2.2	0.4	7.94	3.18	3.4	○							
	3QP-TPGW130308	3	2.2	0.8	7.94	3.18	3.4	○							
	3QP-TPGW16T302	3	2.2	0.2	9.525	3.97	4.4	○							
	3QP-TPGW16T308	3	1.9	0.8	9.525	3.97	4.4	○							
	3QP-TPGW160404	3	2.2	0.4	9.525	4.76	4.4	○							
	3QP-TPGW160408	3	1.9	0.8	9.525	4.76	4.4	○							
3QP-TPGW**F	3QP-TPGW110304F	3	2.2	0.4	6.35	3.18	3.4		○						
	3QP-TPGW110308F	3	1.9	0.8	6.35	3.18	3.4		○						
3QP-TPGW**-L	3QP-TPGW110304-L	3	2.2	0.4	6.35	3.18	3.4			○					
	3QP-TPGW110308-L	3	2.2	0.8	6.35	3.18	3.4			○					
3QP-TPGW**-LF	3QP-TPGW110304-LF	3	2.2	0.4	6.35	3.18	3.4				○				
	3QP-TPGW110308-LF	3	2.2	0.8	6.35	3.18	3.4				○				
3QP-TPGW**-LC	3QP-TPGW110304-LC	3	2.2	0.4	6.35	3.18	3.4					○			
	3QP-TPGW110308-LC	3	2.2	0.8	6.35	3.18	3.4					○			
3QP-TPGW**-H	3QP-TPGW110304-H	3	2.2	0.4	6.35	3.18	3.4						○		
	3QP-TPGW110308-H	3	2.2	0.8	6.35	3.18	3.4						○		
	3QP-TPGW160404-H	3	2.2	0.4	9.525	4.76	4.4						○		
	3QP-TPGW160408-H	3	1.9	0.8	9.525	4.76	4.4						○		

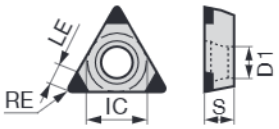
● : Line up

Reference pages: Internal toolholder → D043 - Cartridge → K193 -
Boring bar tool → K209 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX470	BX480	BX910	BX930
P	Steel										
M	Stainless										
K	Cast iron							◐	✠	●	◐
N	Non-ferrous										
S	Superalloy										
H	Hard material	●	◐	◐	●	◐	◐				
	Sintered metal							◐	✠		

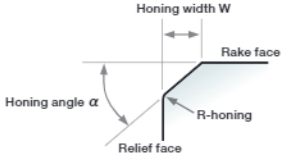


Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
3QP-TPGT	3QP-TPGT110304-HP	3	2.2	0.4	6.35	3.18	3.4								○
	3QP-TPGT110308-HP	3	1.9	0.8	6.35	3.18	3.4								○
3QP-TPMW	3QP-TPMW080204	3	2.2	0.4	4.76	2.38	2.3	○							
	3QP-TPMW090202	3	2.3	0.2	5.56	2.38	2.5	○							
	3QP-TPMW090204	3	2.2	0.4	5.56	2.38	2.5	○							
	3QP-TPMW110202	3	2.3	0.2	6.35	2.38	2.8	○							
	3QP-TPMW110204	3	2.2	0.4	6.35	2.38	2.8	○							
	3QP-TPMW110302	3	2.3	0.2	6.35	3.18	3.4	○							
	3QP-TPMW110304	3	2.2	0.4	6.35	3.18	3.4	○							
	3QP-TPMW110308	3	1.9	0.8	6.35	3.18	3.4	○							
	3QP-TPMW130302	3	2.4	0.2	7.94	3.18	3.4	○							
	3QP-TPMW130304	3	2.2	0.4	7.94	3.18	3.4	○							
	3QP-TPMW16T304	3	2.2	0.4	9.525	3.97	4.4	○							
	3QP-TPMW16T308	3	1.9	0.8	9.525	3.97	4.4	○							
	3QP-TPMW160404	3	2.2	0.4	9.525	4.76	4.4	○							
	3QP-TPMW160408	3	1.9	0.8	9.525	4.76	4.4	○							
3QP-TCGW	3QP-TCGW090204	3	2.2	0.4	5.56	2.38	2.5	○							
	3QP-TCGW090208	3	1.9	0.8	5.56	2.38	2.5	○							
	3QP-TCGW110204	3	2.2	0.4	6.35	2.38	2.8	○							
	3QP-TCGW110208	3	1.9	0.8	6.35	2.38	2.8	○							
	3QP-TCGW16T304	3	2.2	0.4	9.525	3.97	4.3	○							
	3QP-TCGW16T308	3	1.9	0.8	9.525	3.97	4.3	○							

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

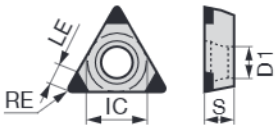
T --- Chamfered honing
S --- Chamfered + R-honing
E --- R-honing alone
F --- Sharp edge

Reference pages: Internal toolholder → D043 - Cartridge → K193 -
Boring bar tool → K209 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



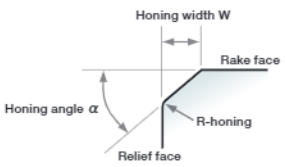
Shape	Designation	BX330	BX360	Dimension (mm) No. of corners	LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
Q-TPMW	**Q-TPMW080204**	●		1	2.2	0.4	4.76	2.38	2.3	○							
	Q-TPMW090202	●		1	2.4	0.2	5.56	2.38	2.5	○							
	Q-TPMW090204	●		1	2.3	0.4	5.56	2.38	2.5	○							
	Q-TPMW110202	●		1	2.4	0.2	6.35	2.38	2.8	○							
	Q-TPMW110204	●		1	2.2	0.4	6.35	2.38	2.8	○							
	Q-TPMW110304	●		1	2.3	0.4	6.35	3.18	3.4	○							
	Q-TPMW110308	●		1	2.2	0.8	6.35	3.18	3.4	○							
	Q-TPMW130302	●		1	2.4	0.2	7.94	3.18	3.4	○							
	Q-TPMW130304	●		1	2.3	0.4	7.94	3.18	3.4	○							
	Q-TPMW16T304	●		1	2.3	0.4	9.525	3.97	4.4	○							
	Q-TPMW160404	●		1	2.3	0.4	9.525	4.76	4.4	○							
	Q-TPMW160408	●		1	1.9	0.8	9.525	4.76	4.4	○							
TPGW-QBN**	**TPGW090202-QBN**		●	1	3.3	0.2	5.56	2.38	2.5	○							
	TPGW090204-QBN		●	1	3.2	0.4	5.56	2.38	2.5	○							
	TPGW110202-QBN		●	1	3.9	0.2	6.35	2.38	2.8	○							
	TPGW110204-QBN		●	1	3.7	0.4	6.35	2.38	2.8	○							
	TPGW130302-QBN		●	1	3.9	0.2	7.94	3.18	3.4	○							
	TPGW130304-QBN		●	1	3.7	0.4	7.94	3.18	3.4	○							
	TPGW16T302-QBN		●	1	4.4	0.2	9.525	3.97	4.4	○							
	TPGW16T304-QBN		●	1	4.2	0.4	9.525	3.97	4.4	○							
	TPGW16T308-QBN		●	1	4.0	0.8	9.525	3.97	4.4	○							
TPGA-QBN**	**TPGA090202-QBN**		●	1	3.1	0.2	5.56	2.38	3.2	○							
	TPGA090204-QBN		●	1	2.9	0.4	5.56	2.38	3.2	○							
	TPGA110202-QBN		●	1	3.9	0.2	6.35	2.38	3.0	○							
	TPGA110204-QBN		●	1	3.7	0.4	6.35	2.38	3.0	○							
	TPGA110302-QBN		●	1	3.9	0.2	6.35	3.18	3.0	○							
	TPGA110304-QBN		●	1	3.7	0.4	6.35	3.18	3.0	○							
	TPGA160302-QBN		●	1	4.4	0.2	9.525	3.18	4.0	○							
	TPGA160304-QBN		●	1	4.2	0.4	9.525	3.18	4.0	○							
	TPGA160308-QBN		●	1	4.0	0.8	9.525	3.18	4.0	○							

Q-TPMW: 2 pieces per package

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

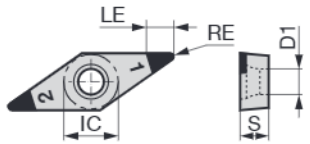
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: Internal toolholder → D043 - Cartridge → K193 -
Boring bar tool → K209 -

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX930
P	Steel							
M	Stainless							
K	Cast iron						◐	◐
N	Non-ferrous							
S	Superalloy							
H	Hard material	●	◐	◐	●	◐	◐	
	Sintered metal							

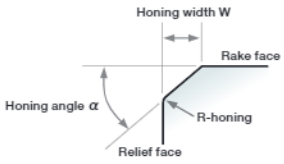


Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-VBGW	2QP-VBGW110204	2	3.1	0.4	6.35	2.38	2.8	○							
	2QP-VBGW110208	2	2.2	0.8	6.35	2.38	2.8	○							
	2QP-VBGW110304	2	3.1	0.4	6.35	3.18	2.8	○							
	2QP-VBGW110308	2	2.2	0.8	6.35	3.18	2.8	○							
	2QP-VBGW160404	2	3.1	0.4	9.525	4.76	4.4	○							
	2QP-VBGW160408	2	2.2	0.8	9.525	4.76	4.4	○							
	2QP-VBGW160412	2	3.0	1.2	9.525	4.76	4.4	○							
2QP-VBGW**-L	2QP-VBGW110304-L	2	3.1	0.4	6.35	3.18	2.8			○					
	2QP-VBGW110308-L	2	2.2	0.8	6.35	3.18	2.8			○					
	2QP-VBGW160404-L	2	3.1	0.4	9.525	4.76	4.4			○					
	2QP-VBGW160408-L	2	2.2	0.8	9.525	4.76	4.4			○					
2QP-VBGW**-LF	2QP-VBGW110304-LF	2	3.1	0.4	6.35	3.18	2.8				○				
	2QP-VBGW110308-LF	2	2.2	0.8	6.35	3.18	2.8				○				
	2QP-VBGW160404-LF	2	3.1	0.4	9.525	4.76	4.4				○				
	2QP-VBGW160408-LF	2	2.2	0.8	9.525	4.76	4.4				○				
2QP-VBGW**-LC	2QP-VBGW110304-LC	2	3.1	0.4	6.35	3.18	2.8					○			
	2QP-VBGW110308-LC	2	2.2	0.8	6.35	3.18	2.8					○			
	2QP-VBGW160404-LC	2	3.1	0.4	9.525	4.76	4.4					○			
	2QP-VBGW160408-LC	2	2.2	0.8	9.525	4.76	4.4					○			
2QP-VBGW**-H	2QP-VBGW160404-H	2	3.1	0.4	9.525	4.76	4.4						○		
	2QP-VBGW160408-H	2	2.2	0.8	9.525	4.76	4.4						○		

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

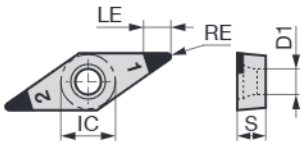
T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

Reference pages: External toolholder → C062 - Internal toolholder → D036 -
J-Series toolholder → G033 - TungCap → K022

CBN Insert POSITIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

		BXM10	BXM20	BXA20	BX310	BX330	BX360	BX930
P	Steel							
M	Stainless							
K	Cast iron							●◐
N	Non-ferrous							
S	Superalloy							
H	Hard material	●	●◐	●◐	●	●◐	●◐	
	Sintered metal							

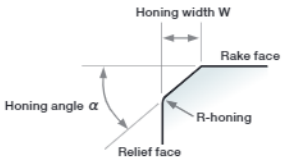


Shape	Designation	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
2QP-VBGT**-HP	2QP-VBGT110304-HP	2	3	0.4	6.35	3.18	2.8								○
	2QP-VBGT110308-HP	2	2.2	0.8	6.35	3.18	2.8								○
	2QP-VBGT160404-HP	2	3	0.4	9.525	4.76	4.4								○
	2QP-VBGT160408-HP	2	2.2	0.8	9.525	4.76	4.4								○
2QP-VBMW	2QP-VBMW110304	2	3.1	0.4	6.35	3.18	2.8	○							
	2QP-VBMW110308	2	2.2	0.8	6.35	3.18	2.8	○							
	2QP-VBMW160404	2	3.1	0.4	9.525	4.76	4.4	○							
	2QP-VBMW160408	2	2.2	0.8	9.525	4.76	4.4	○							
2QP-VCGW	2QP-VCGW080204	2	3.1	0.4	4.76	2.38	2.3	○							
	2QP-VCGW080208	2	2.2	0.8	4.76	2.38	2.3	○							
	2QP-VCGW160404	2	3.1	0.4	9.525	4.76	4.4	○							
	2QP-VCGW160408	2	2.2	0.8	9.525	4.76	4.4	○							
2QP-VCGW**-H	2QP-VCGW160404-H	2	3.1	0.4	9.525	4.76	4.4						○		
	2QP-VCGW160408-H	2	2.2	0.8	9.525	4.76	4.4						○		
2QP-VCMW	2QP-VCMW160404	2	3.1	0.4	9.525	4.76	4.4	○							

● : Line up

Honing specification

	BXM10 BX310 BX330 BX480	BXA20	BXM20	BX360 BX380	BX470	BX910 BX930 BXC50	BXC90
Standard	S01325	S01325	S01325	S01325	T01315	S01325	T02020
Sharp edge	-	-	-	-	F	-	-
-L	S01315	S01315	S01315	-	-	-	-
-LF	-	S00515	-	-	-	-	-
-LC	-	S00535	-	-	-	-	-
-H	-	S01835	S01835	S01335	-	-	-
Wiper	S01315	S01315	S01315	-	-	-	-



S	0	1	3	2	5
Shape	Honing width (W) (mm)			Honing angle : α	

T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

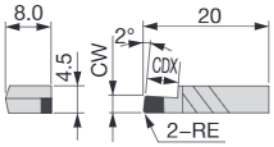
Reference pages: External toolholder → C062 - Internal toolholder → D036 -
J-Series toolholder → G033 - TungCap → K016 -

CBN Insert NEGATIVE TYPE

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

For GX-RE

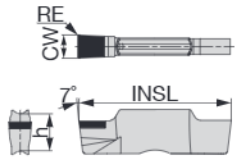
P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	
S	Superalloy	
H	Hard material	●◐



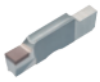
Shape	Designation	BX360	Dimension (mm) CW±0.05	RE	CDX
XGR**-QBN	XGR6310S-QBN		-	-	-
	XGR6315S-QBN	●	1.5	0.2	2.3
	XGR6320S-QBN	●	2	0.2	3
	XGR6325S-QBN	●	2.5	0.2	3.8
	XGR6330S-QBN	●	3	0.2	4.5
	XGR6335S-QBN	●	3.5	0.2	5.3
	XGR6340S-QBN	●	4	0.2	6
	XGR6345S-QBN	●	4.5	0.2	6

For TungCut

P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	
S	Superalloy	
H	Hard material	●◐



Shape	Designation	BX360	Dimension (mm) Seat size	CW±0.025	RE	INSL	h
SGN	SGN200-020	●	2	2	0.2	20	5
	SGN300-020	●	3	3	0.2	20	5
	SGN400-020	●	4	4	0.2	20	5



● : Line up

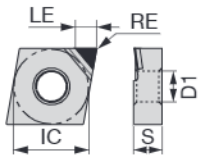
Reference pages: XGR...: Toolholder → F082 - SGN...: Toolholder → F010 -

PCD Insert

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

Negative type with rake

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Shape	Designation	DX110	DX120	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Sharp edge	Rake angle
CNMN**-DIA	CNMM120402-DIA		●	1	3.5	0.2	12.7	4.76	5.16	○	○
	CNMM120404-DIA		●	1	3.5	0.4	12.7	4.76	5.16	○	○
	1QP-CNMM120402	●		1	2.8	0.2	12.7	4.76	5.16	○	○
	1QP-CNMM120404	●		1	2.8	0.4	12.7	4.76	5.16	○	○
DNMM**-DIA	DNMM150402-DIA		●	1	3.3	0.2	12.7	4.76	5.16	○	○
	DNMM150404-DIA		●	1	3.1	0.4	12.7	4.76	5.16	○	○
											
TNMM**-DIA	TNMM160402-DIA		●	1	3.3	0.2	9.528	4.76	3.81	○	○
	TNMM160404-DIA		●	1	3.2	0.4	9.528	4.76	3.81	○	○
	1QP-TNMM160402	●		1	2.7	0.2	9.528	4.76	3.81	○	○
	1QP-TNMM160404	●		1	2.6	0.4	9.528	4.76	3.81	○	○
VNMM**-DIA	VNMM160402-DIA		●	1	4.8	0.2	9.528	4.76	3.81	○	○
	VNMM160404-DIA		●	1	4.4	0.4	9.528	4.76	3.81	○	○
	VNMM160408-DIA		●	1	3.6	0.8	9.528	4.76	3.81	○	○

● : Line up

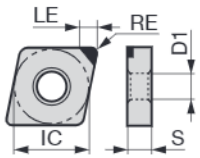
Reference pages: External toolholder → C016 - | Internal toolholder → D021 -
J-Series toolholder → G044 | TungCap → K008 -
PINZBOHR® → K180 - | Cartridge → K199 -

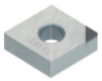
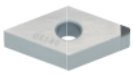
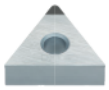
PCD Insert

● : Continuous cutting
ⓒ : Light interrupted cutting
✠ : Heavy interrupted cutting

Negative type

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Shape	Designation	DX140	DX160	Dimension (mm) No. of corners	LE	RE	IC	S	D1	Honing Sharp edge
CNGA-DIA**	**CNGA120404-DIA**	●		1	3.5	0.4	12.7	4.76	5.16	○
	CNGA120408-DIA	●		1	2.8	0.8	12.7	4.76	5.16	○
DNGA-DIA**	**DNGA150404-DIA**	●	●	1	3.1	0.4	12.7	4.76	5.16	○
	DNGA150408-DIA	●		1	2.8	0.8	12.7	4.76	5.16	○
SNGA-DIA**	**SNGA120404-DIA**	●		1	3.6	0.4	12.7	4.76	5.16	○
	SNGA120408-DIA	●		1	3.6	0.8	12.7	4.76	5.16	○
SNGN-DIA**	**SNGN120408-DIA**	●		1	3.6	0.8	12.7	4.76		○
										
TNGA-DIA**	**TNGA160404-DIA**	●	●	1	3.2	0.4	9.525	4.76	3.81	○
	TNGA160408-DIA	●	●	1	2.9	0.8	9.525	4.76	3.81	○

● : Line up

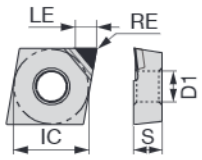
Reference pages:
External toolholder → C016 -
J-Series toolholder → G044 -
Cartridge → K193 -
Internal toolholder → D021 -
TungCap → K008 -

PCD Insert

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

Positive type with rake

P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	●◐ ●◐
S	Superalloy	
H	Hard material	



Shape	Designation	DX110	DX120	Dimension (mm) No. of corners	LE	RE	IC	S	D1	Honing Sharp edge	Rake angle
CCMT-DIA**	**CCMT060202-DIA**		●	1	2.4	0.2	6.35	2.38	2.8	○	○
	CCMT060204-DIA		●	1	2.4	0.4	6.35	2.38	2.8	○	○
	CCMT09T302-DIA		●	1	2.4	0.2	9.525	3.97	4.4	○	○
	CCMT09T304-DIA		●	1	2.4	0.4	9.525	3.97	4.4	○	○
	1QP-CCMT060204	●		1	2.4	0.4	6.35	2.38	2.8	○	○
	1QP-CCMT09T304	●		1	2.4	0.4	6.35	3.97	4.4	○	○
DCMT-DIA**	**DCMT070202-DIA**		●	1	2.3	0.2	6.35	2.38	2.8	○	○
	DCMT070204-DIA		●	1	2.1	0.4	6.35	2.38	2.8	○	○
	DCMT11T302-DIA		●	1	3.2	0.2	9.525	3.97	4.4	○	○
	DCMT11T304-DIA		●	1	3.0	0.4	9.525	3.97	4.4	○	○
TCMT-DIA**	**TCMT080202-DIA**		●	1	2.2	0.2	4.76	2.38	2.7	○	○
	TCMT080204-DIA		●	1	2.0	0.4	4.76	2.38	2.7	○	○
	TCMT110202-DIA		●	1	2.4	0.2	6.35	2.38	2.8	○	○
	TCMT110204-DIA		●	1	2.2	0.4	6.35	2.38	2.8	○	○
	TCMT110302-DIA		●	1	2.4	0.2	6.35	3.18	2.8	○	○
	TCMT110304-DIA		●	1	2.2	0.4	6.35	3.18	2.8	○	○
	1QP-TCMT110304	●		1	2.2	0.4	6.35	3.18	2.8	○	○
VCMT-DIA**	**VCMT160402-DIA**		●	1	4.8	0.2	9.525	4.76	4.4	○	○
	VCMT160404-DIA		●	1	4.4	0.4	9.525	4.76	4.4	○	○

● : Line up

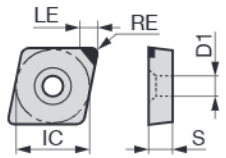
Reference pages: External toolholder → C024 - Internal toolholder → D014 -
J-Series toolholder → G019 - TungCap → K016 -
PINZBOHR® → K180 -

PCD Insert

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

Positive type

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Shape	Designation	DX120	DX140	DX160	No. of corners	LE	RE	IC	S	D1	Sharp edge
					Dimension (mm)						Honing
CCGW-DIA**	CCGW060200-DIA		●		1	2.4	0.05	6.35	2.38	2.8	○
	CCGW060202-DIA		●		1	2.4	0.2	6.35	2.38	2.8	○
	CCGW060204-DIA		●		1	2.4	0.4	6.35	2.38	2.8	○
	CCGW09T302-DIA		●		1	3.5	0.2	9.525	3.97	4.4	○
	CCGW09T304-DIA		●	●	1	3.5	0.4	9.525	3.97	4.4	○
	CCGW09T308-DIA		●		1	3.4	0.8	9.525	3.97	4.4	○
CPGA-DIA**	CPGA080202-DIA		●		1	2.4	0.2	9.525	2.38	4.0	○
	CPGA090204-DIA		●		1	3.5	0.4	9.525	2.38	4.0	○
DCGW-DIA**	DCGW070200-DIA		●		1	2.4	0.05	6.35	2.38	2.8	○
	DCGW070202-DIA	●	●		1	2.3	0.2	6.35	2.38	2.8	○
	DCGW070204-DIA		●		1	2.1	0.4	6.35	2.38	2.8	○
	DCGW11T302-DIA		●		1	3.2	0.2	9.525	3.97	4.4	○
	DCGW11T304-DIA		●		1	3.0	0.4	9.525	3.97	4.4	○
	DCGW11T308-DIA		●		1	2.7	0.8	9.525	3.97	4.4	○
EPGW-DIA**	EPGW040102-DIA		●		1	2.0	0.2	3.97	1.59	2.3	○
	EPGW040104-DIA		●		1	1.9	0.4	3.97	1.59	2.3	○
SPGN-DIA**	SPGN090308-DIA		●		1	3.6	0.8	9.525	3.18	-	○
	SPGN120302-DIA		●		1	3.6	0.2	12.7	3.18	-	○
	SPGN120304-DIA		●		1	3.6	0.4	12.7	3.18	-	○
	SPGN120308-DIA		●	●	1	3.6	0.8	12.7	3.18	-	○

● : Line up

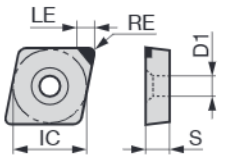
Reference pages: External toolholder → C024 - Internal toolholder → D014 -
Cartridge → K197 - Boring bar tool → K211 -
Top-borer tool → K213

PCD Insert

● : Continuous cutting
◐ : Light interrupted cutting
✠ : Heavy interrupted cutting

Positive type

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



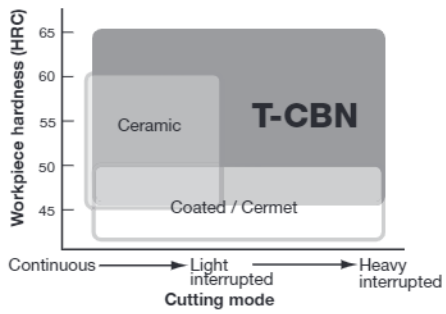
Shape	Designation	DX120	DX140	No. of corners	Dimension (mm) LE	RE	IC	S	D1	Honing Sharp edge
TPGA-DIA**	TPGA090202-DIA		●	1	2.4	0.2	5.56	2.38	2.5	○
	TPGA090204-DIA		●	1	2.2	0.4	5.56	2.38	2.5	○
	TPGA110202-DIA		●	1	2.4	0.2	6.35	2.38	2.8	○
	TPGA110204-DIA		●	1	2.2	0.4	6.35	2.38	2.8	○
	TPGA110302-DIA		●	1	2.4	0.2	6.35	3.18	3.0	○
	TPGA110304-DIA		●	1	2.2	0.4	6.35	3.18	3.0	○
	TPGA110308-DIA		●	1	2.9	0.8	6.35	3.18	3.0	○
	TPGA160302-DIA		●	1	3.3	0.2	9.525	3.18	4.0	○
	TPGA160304-DIA		●	1	3.2	0.4	9.525	3.18	4.0	○
	TPGA160308-DIA		●	1	2.9	0.8	9.525	3.18	4.0	○
TPGN-DIA**	TPGN090204-DIA		●	1	2.2	0.4	5.56	2.38	-	○
	TPGN110304-DIA	●	●	1	3.2	0.4	6.35	3.18	-	○
	TPGN110308-DIA		●	1	2.9	0.8	6.35	3.18	-	○
	TPGN160302-DIA		●	1	3.3	0.2	9.525	3.18	-	○
	TPGN160304-DIA	●	●	1	3.2	0.4	9.525	3.18	-	○
	TPGN160308-DIA		●	1	2.9	0.8	9.525	3.18	-	○
TPGW-DIA**	TPGW080202-DIA		●	1	2.4	0.2	4.76	2.38	2.3	○
	TPGW080204-DIA		●	1	2.3	0.4	4.76	2.38	2.3	○
	TPGW090202-DIA	●	●	1	2.4	0.2	5.56	2.38	2.5	○
	TPGW090204-DIA		●	1	2.2	0.4	5.56	2.38	2.5	○
	TPGW110202-DIA	●	●	1	2.4	0.2	6.35	2.38	2.8	○
	TPGW110204-DIA		●	1	2.2	0.4	6.35	2.38	2.8	○
	TPGW130302-DIA	●	●	1	3.3	0.2	7.94	3.18	3.4	○
	TPGW130304-DIA		●	1	3.2	0.4	7.94	3.18	3.4	○
	TPGW16T302-DIA		●	1	3.3	0.2	9.525	3.97	4.4	○
	TPGW16T304-DIA		●	1	3.2	0.4	9.525	3.97	4.4	○
	TPGW16T308-DIA		●	1	2.9	0.8	9.525	3.97	4.4	○
VCGW-DIA**	VCGW160402-DIA		●	1	4.8	0.2	9.525	4.76	4.4	○
	VCGW160404-DIA		●	1	4.4	0.4	9.525	4.76	4.4	○

● : Line up

Reference pages: External toolholder → C063 - Internal toolholder → D043 -
Cartridge → K193 - Boring bar tool → K209 -

H T-CBN series for hardened steel and hard material

Application area



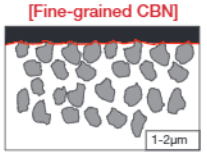
Necessity of PCBN grades

The condition necessary to cut the work

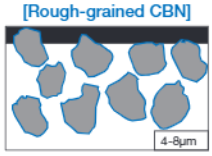
Material is:
Hardness of tool ≥ Hardness of tool X 3

● Hardened steel (60HRC) → 700 Hv ● Cemented carbide → 1600 Hv
● PCBN (BX360) → 3300 Hv

Relation of CBN grain size, surface roughness, and cutting speed

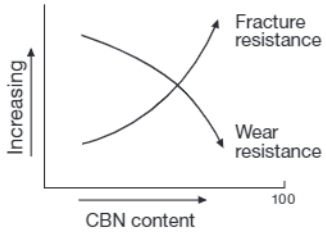


Fine grained PCBN provided with sharp cutting edge.
Good surface roughness



Rough grained PCBN. CBN particles are hold firmly.
Allows high speed machining

● Features of CBN grades for machining hardened steel and other hard materials



Fewer CBN content ⇨ Increasing wear resistance
Much CBN content ⇨ Increasing impact resistance

Basic selection of T-CBN grades in machining of hardened steel and hard material

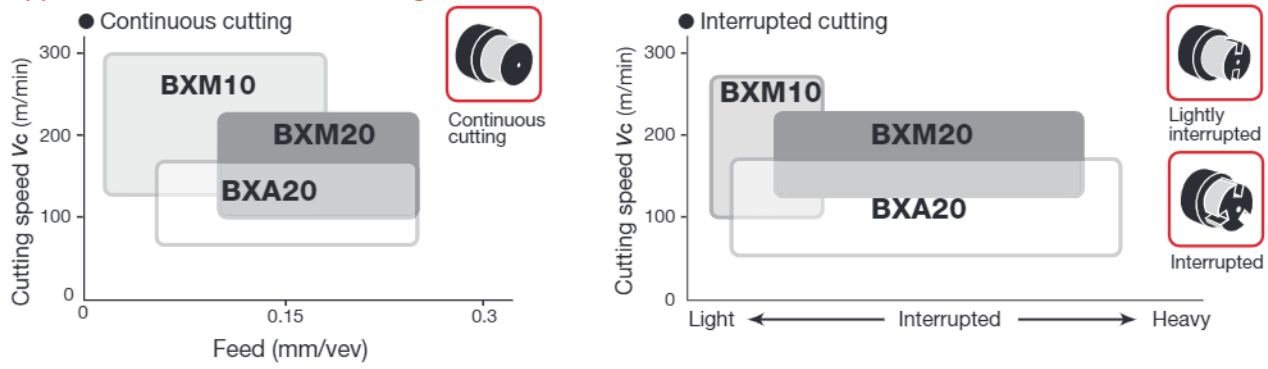
● Coated T-CBN grades

BXM10 For high speeds cutting
BXM20 For general purpose, more than *Vc* = 180 m/min
BXA20 For general purpose, less than *Vc* = 180 m/min

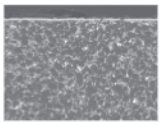
● Uncoated T-CBN grades

BX310 For high speeds / Priority on wear resistance in continuous cutting
BX330 For medium speeds / Priority on surface quality
BX360 For low to medium speeds / General purpose grade with excellent fracture resistance
BX380 For low to medium speeds / Priority on fracture resistance in heavy interrupted cutting

Application area of coated T-CBN grades



Effects of Coated T-CBN grades



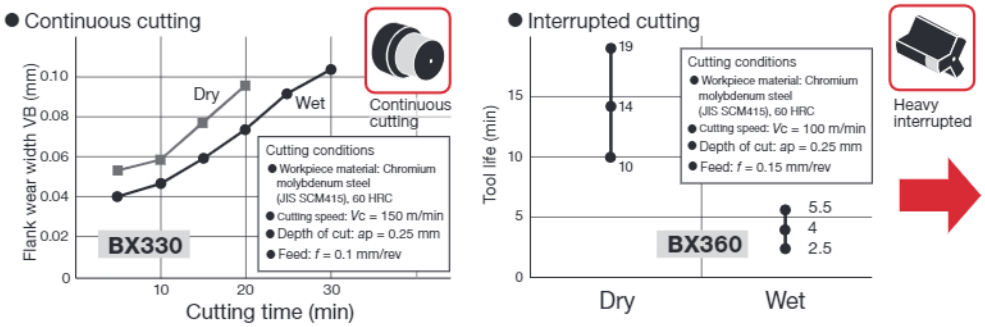
Coated on hard CBN
Hardness:
CBN > Coating layer

● **Protect CBN from oxidation wear**
Since the coating layer intercepts air, oxidation wear of CBN can be prevented.

● **Peeling of coating layer can be prevented**
Hard and deformation resistant CBN is excellent substrate material.

➡ **Improved resistance to flank wear**

Effects of coolant in machining of hardened steel



➡

- In continuous cutting, wet cutting is superior to dry cutting in tool life for wear.
- In interrupted cutting, dry cutting is superior to wet cutting in tool life for fracture.

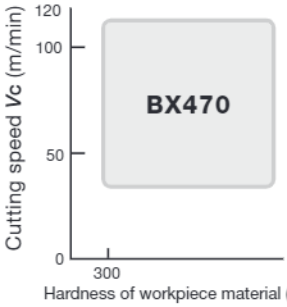
Technical Guide

T-CBN series for sintered metal

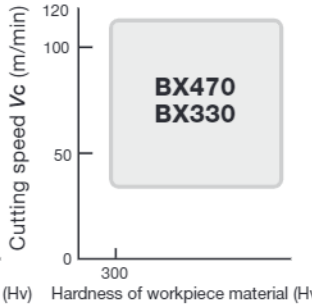
Application area

● Ferrous Sintered metal

● Valve seat (Plunge cutting)



● Valve seat (Traverse cutting)

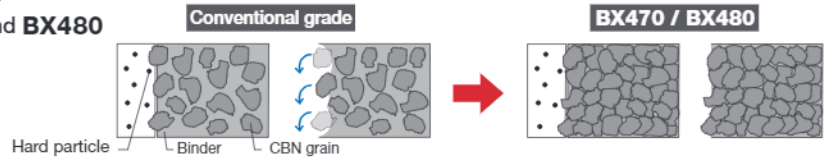


BX470
Priority on burr prevention and surface finish

BX480
Priority on wear resistance and versatility

Features of BX470 and BX480

● Machining of sintered metal with hard particles



Binder phase are selectively worn away by hard particles.
⇨ Wear proceeds with falling-out of CBN grains,

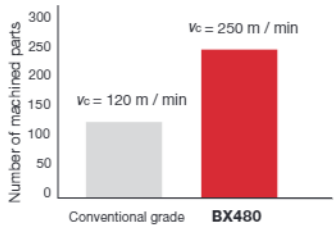
By increasing CBN content, wear of binder layer is suppressed.
⇨ Improved wear resistance

● Features of **BX470** and **BX480**

CBN content: 95 vol%
Hv = 4100 ~ 4300

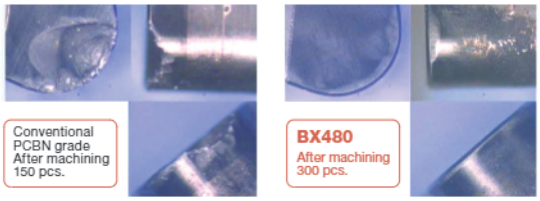
The world highest CBN content as a commercially available material.

■ **BX480** (Facing of gears)



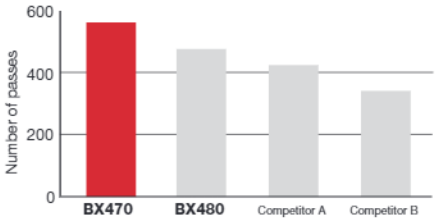
Cutting conditions
- Workpiece material: Sintered metal (> HRA60)
- Insert: DCMW11T308
- Depth of cut: ap = 0.2 ~ 0.5 mm
- Feed : f = 0.07 mm/rev
- Coolant : Water soluble type
- Interrupted cutting

■ **BX470/BX480** Tool failure after machining sintered metal



Cutting conditions
- Workpiece material: Sintered metal (> HRA60), Nitriding, Hard particles included
- Cutting speed: Vc = 110 m/min
- Depth of cut: ap = 0.15 mm
- Feed: f = 0.1 mm/rev
- Coolant : Water soluble type
- Interrupted cutting

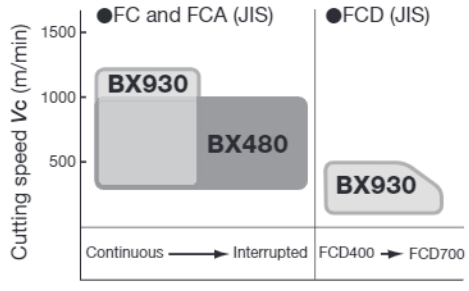
■ **BX470** (Tool life criterion: Burr occurrence)



Cutting conditions
- Workpiece material: Ferrous Sintered metal
- Cutting speed: Vc = 100 m/min
- Depth of cut: ap = 0.15 ~ 0.3 mm
- Feed: f = 0.07 ~ 0.25 mm/rev
- Dry and interrupted cutting

K T-CBN series for grey cast iron and ductile cast iron

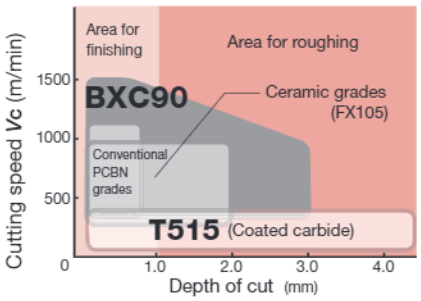
Application area



BX930
- General purpose, first choice grade.
- Dedicated grade for machining ductile Cast iron

BX480
- Suitable for interrupted machining
- Excellent fracture resistance

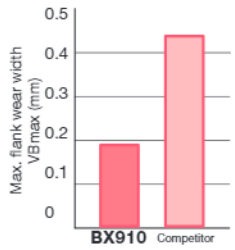
● FC Solid coated T-CBN grades



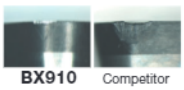
BXC90
- One-piece solid structure
- Applicable for small to large depths of cut

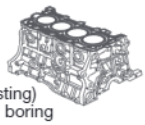
■ Machining of cylinder liners (Machining example of **BX910**)

●Wear width after machining 120 pcs.



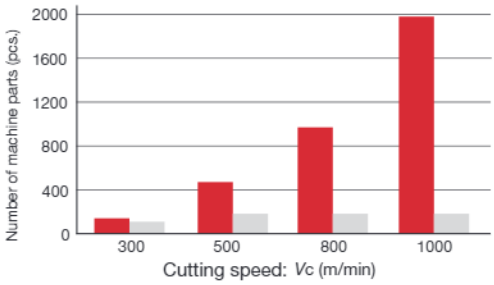
●Tool failure after machining 120 pcs.





Cutting conditions
- Workpiece material: Cylinder liner (Spin casting) Machining type: Finish boring
- Cutting speed: Vc = 1,000 m/min
- Machine: Special purpose machine
- Coolant: Wet

■ Tool life comparison in machining of disc brakes



Cutting conditions
- Workpiece material: Disc rotor (JIS FC250)
- Insert: SNGN 120412 BXC90
- Depth of cut: ap = 0.7 mm
- Feed: f = 0.35 mm/rev
- Coolant: Dry
- Tool life criterion: Conditions of finished surface

BX910 For machining cylinder liners

T-CBN Series

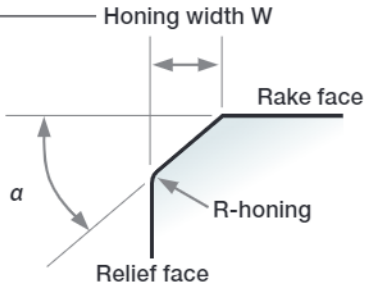
Honing specifications

● T-CBN inserts with special honing specifications are made to order. Refer to the following description.

Designation system for honing

Example:
Honing width: 0.15 mm
Honing angle: -30°
With R-honing

S	0	1	3	2	5
Shape	Honing width (W)			Honing angle (α)	



T ··· Chamfered honing
S ··· Chamfered + R-honing
E ··· R-honing alone
F ··· Sharp edge

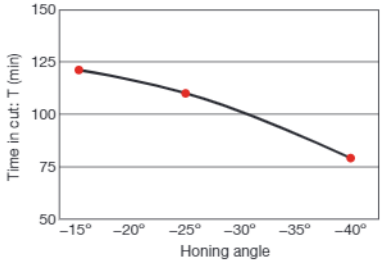
● Symbol

W	Amount of honing (mm)
005	0.05
010	0.10
013	0.13
015	0.15
018	0.18

α	Honing angle
10°	-10°
15°	-15°
20°	-20°
25°	-25°
30°	-30°
35°	-35°
40°	-40°

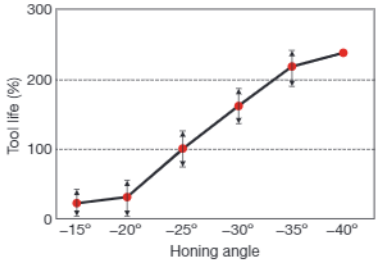
● Honing specification can be selected in combination of items described here.
● Inserts with "R" honing alone are available.

● Relationship between honing angle and tool life in continuous turning



Cutting conditions
Workpiece material: Chromium molybdenum steel (JIS SCM415), 60 HRC
Insert: TNGN160404 BX360
Cutting speed: *Vc* = 100 m/min
Feed: *f* = 0.15 mm/rev
Depth of cut: ap = 0.25 mm
Coolant: Dry
Tool life criterion: VBmax = 0.15 mm
Honing: -□□°+ R-honing

● Relationship between honing angle and tool life in interrupted turning



Cutting conditions
Workpiece material: Chromium molybdenum steel (JIS SCM415), 60 HRC
Insert: TNGN160404 BX360
Cutting speed: *Vc* = 100 m/min
Feed: *f* = 0.15 mm/rev
Depth of cut: ap = 0.25 mm
Coolant: Dry
Tool life criterion: Fracture
Honing: -□□°+ R-honing

•For continuous cutting, small honing angle is favorable to minimize wear.
•For interrupted cutting, large honing angle is favorable to minimize fracture.

● Standard honing specifications

Grade	BXM10	BXM20	BXA20	BXC50	BX310	BX330	BX360	BX380	BX470	BX480	BX910	BX930
Negative insert	S01325	S01325	S01325	S01325	S01325	S01325	S01325	S01325	T01315	S01325	S01315	S01315
Positive insert	S01325	S01325	S01325	–	S00515	S00515	S00515	–	T01315	S00515	S01315	S00515

Wiper insert

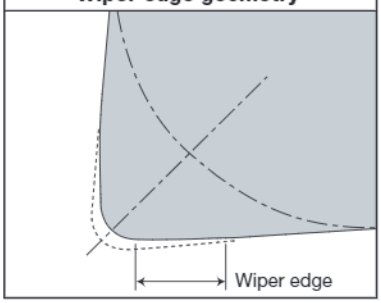
● A finishing edge (wiper edge) is formed at the point of intersection between corner radius and straight cutting edge.

■ Effect of wiper edge

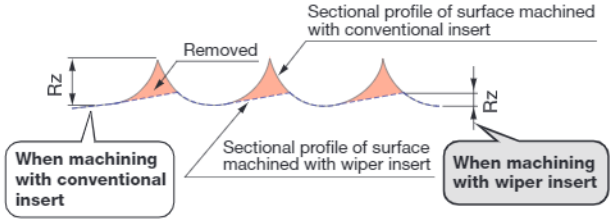
● Doubles the productivity → Reduced machining time
The wiper edge can double the feed rate and moreover does not deteriorate the surface roughness. (Note: Feed rate: *f* < 0.3 mm/rev)

● Superior surface roughness → By integrating roughing and finishing into one process, productivity can be increased.
Compared with conventional inserts only with corner radius, surface roughness can be improved with the wiper edge.

Wiper edge geometry



■ Profiles of surface roughness



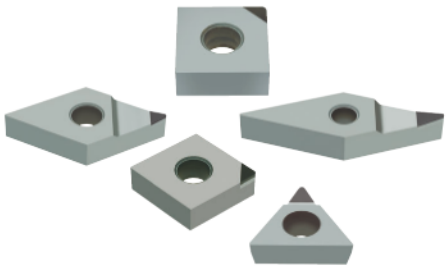
■ Recommended toolholders for wiper inserts

	2QP-CNGA1204**WL	3QP-WNGA080408WL	2QP-DNGA1504**WJ	3QP-TNGA1604**WG
End cutting angle	95°		93°	91°
External toolholder	ACLNR/L**12-A	AWLNR/L**08-A	ADJNR/L**15-A	ATGNR/L**16-A ATFNR/L**16-A
	DCLNR/L**12	DWLNR/L**08	DDJNR/L**15	DTGNR/L**16 DTFNR/L**16
Internal toolholder	A**-ACLNR/L12-D...	A**-AWLNR/L08-D...	A**-ADUNR/L15-D...	A**-ATFNR/L16-D...

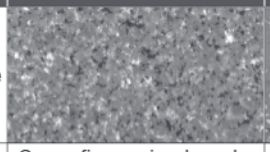
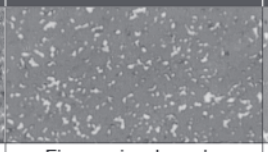
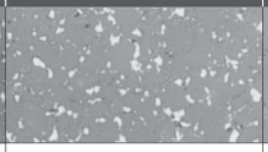
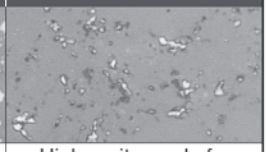
Technical Guide

PCD grade, T-DIA series

Expanded product line allows T-DIA tools to be applied to wider workpiece materials and cutting conditions.

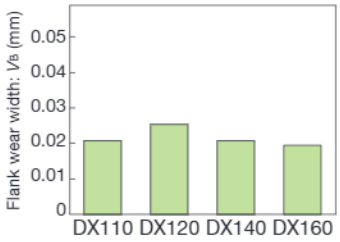


Features and applications (Physical and mechanical properties)

	DX110	DX120	DX140	DX160
Grade				
Property	Super fine grained grade. Excels in surface finish.	Fine grained grade. Excels in surface finish.	General purpose grade	High purity grade for hard materials
Approx. grain size of diamond (μm)	< 1	5	13	28
Hardness (Hv)	8500 →			10000 (Harder)
Wear resistance	→			Higher
Grindability (Cutting edge sharpness)	Better ←			

Cutting performance (Wear resistance)

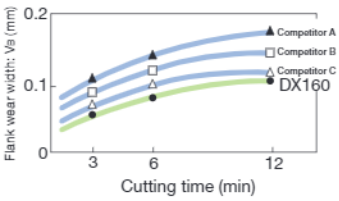
When machining aluminium alloy:



Continuous external turning

- Workpiece material: 10 % Si, aluminium alloy
- Insert: SPGN120308-DIA
- Toolholder: CSBPR2525M4
- Cutting speed: v_c = 500 m/min
- Feed: f = 0.1 mm/rev
- Depth of cut: a_p = 0.5 mm
- Coolant: Dry cutting
- Cutting time: 30 min

When machining FRP:



Face milling

- Workpiece material: Fiber reinforced plastics (FRP)
- Insert: SFCN42ZFN-DIA
- Milling cutter: THF4408RIA
- Cutting speed: v_c = 942 m/min
- Feed: f = 0.1 mm/rev
- Depth of cut: a_p = 1.5 mm
- Coolant: Dry cutting

Grade selection guide

First choice
Excellent finish
DX110

Suitable for finishing aluminum alloys and copper alloy

Good electrical discharge machinability

High diamond content compared to DX110. Suitable for high-speed machining

Complex shape tools
DX120

High speed machining
DX140

Ideal for machining hard materials
Suited for machining bi-metal (ex.aluminum+cast iron) components

High wear resistance
DX160

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade DX110	DX120	DX140	DX160	Cutting speed v_c (m/min)	Depth of cut a_p (mm)	Feed f (mm/rev)
N	Aluminium alloys (Si < 12 %)	◎	○	○		1500 (1000 - 2500)	0.5 (0.05 - 2.0)	0.1 (0.05 - 0.2)
	Aluminium alloys (Si ≥ 12 %)	◎	○	○	○	600 (400 - 800)	0.5 (0.05 - 2.0)	0.1 (0.05 - 0.2)
	Copper, brass	◎	○			800 (500 - 1500)	0.5 (0.05 - 2.0)	0.1 (0.05 - 0.2)
	Phosphor bronze	◎	○	○		400 (300 - 500)	0.5 (0.05 - 2.0)	0.1 (0.05 - 0.2)
	Carbon, graphite		○	○	◎	400 (300 - 500)	0.5 (0.05 - 2.0)	0.1 (0.05 - 0.2)
	FRP		○	○	◎	700 (500 - 1000)	0.2 (0.05 - 0.5)	0.05 (0.03 - 0.1)
	Plastics	◎	○	○		700 (500 - 1000)	0.2 (0.05 - 0.5)	0.03 (0.01 - 0.05)
	Cemented carbides			○	◎	15 (10 - 20)	0.1 (0.05 - 0.2)	0.03 (0.01 - 0.05)
	Green ceramics			○	◎	130 (100 - 150)	0.5 (0.05 - 2.0)	0.05 (0.03 - 0.1)

(Note) ◎ : First choice ○ : Second choice