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## General product information

[View](#)

## Added products



## RE = 0.1, 0.2 mm

Expansion of 0.1 and 0.2 mm corner radius insert

[View](#)



**BXA20**

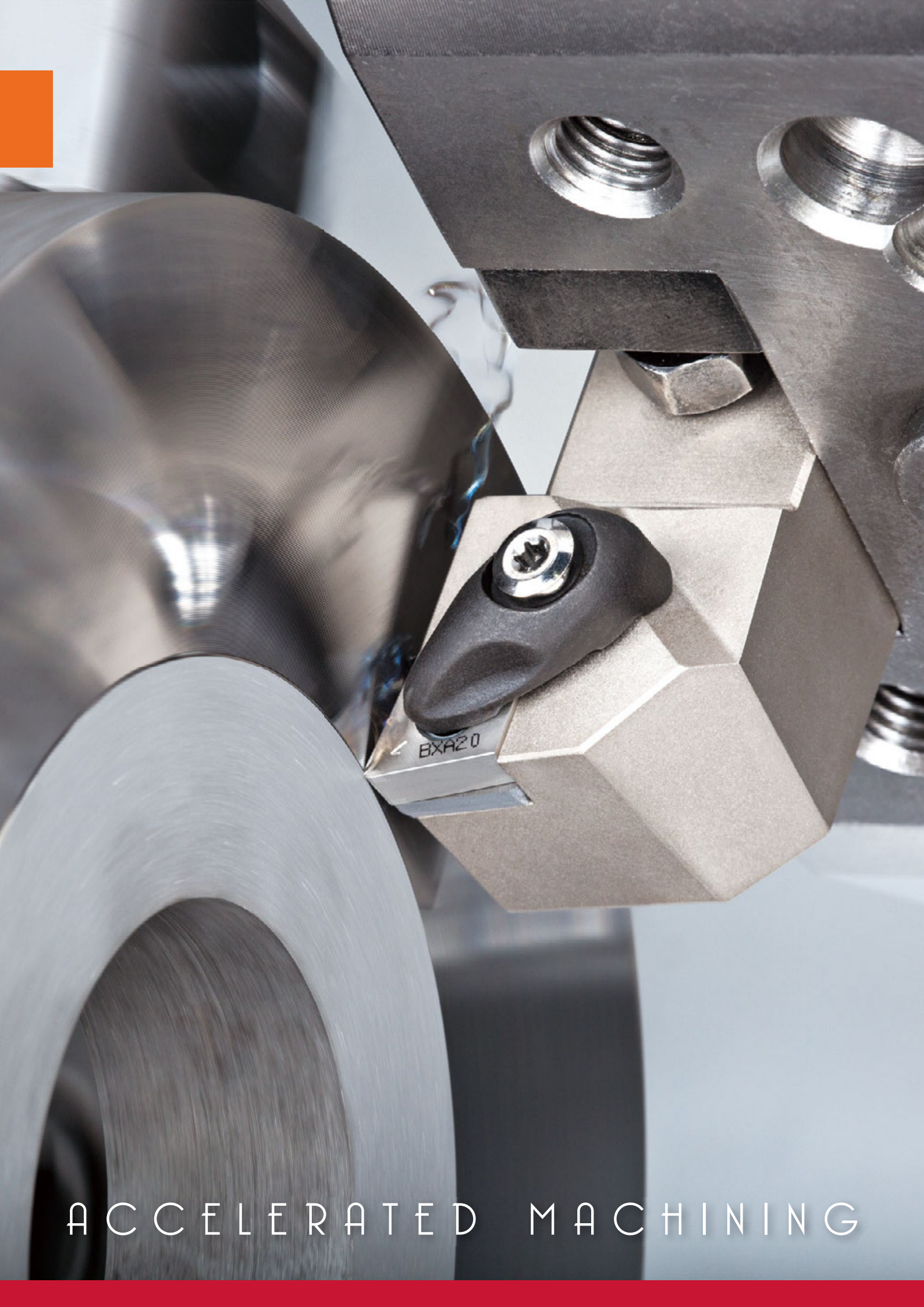
www.tungaloy.com

Tungaloy Report No. 511-G

# Offering new shapes and geometries for expanded coverage



**INDUSTRY 4.0**  
*FEED the SPEED!*



ACCELERATED MACHINING

TurnLine

**BXA20**

TUNGALOY



Versatile coated CBN grades with enhanced edge prep options

[www.tungaloy.com](http://www.tungaloy.com)

# 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

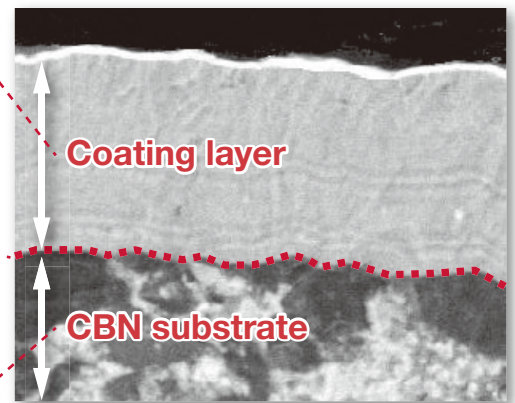
- Provides excellent wear resistance

## Improved adhesion strength

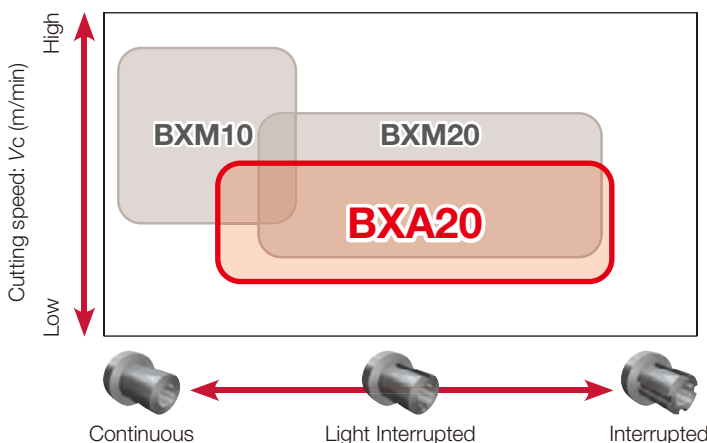
- Prevents peeling-off, providing excellent surface finish

## Newly developed CBN substrate

- Optimum CBN content for high wear resistance and toughness



## APPLICATION AREA



### BXM10

Suitable for continuous to light interrupted cutting at high speed

### BXM20

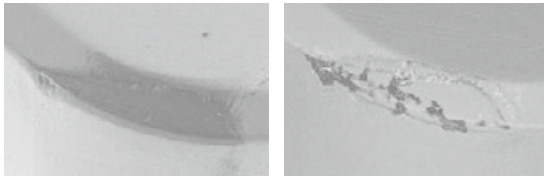
Suitable for continuous to heavy cutting at medium and high speed

### BXA20

Great performance for continuous to heavy cutting at low and medium speed

## CUTTING PERFORMANCE

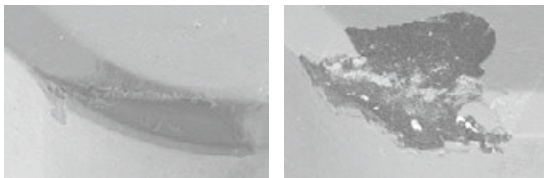
Machining length 0.7 km



**BXA20**

Conventional grade

Machining length 1.4 km

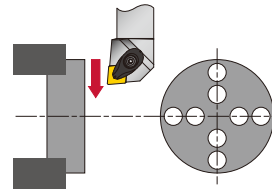


**BXA20**

Conventional grade

**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM420 (60HRC)  
 Cutting speed :  $V_c = 100$  m/min  
 Feed :  $f = 0.1$  mm/rev  
 Depth of cut :  $a_p = 0.2$  mm  
 Machining : Face turning  
 (interrupted cutting)

Without peeling-off, tool life is extended even in heavy interrupted machining.



## STANDARD CUTTING CONDITIONS

ISO	Grade	Insert feature	Workpiece condition	Cutting speed $V_c$ (m/min)	Depth of cut $a_p$ (mm)	Feed $f$ (mm/rev)
<b>H</b>	BXA20	Standard (*QP-****)	Continuous	60 - 180	0.05 - 0.5	0.05 - 0.3
			Interrupted	60 - 180	0.05 - 0.3	0.05 - 0.2
		WavyJoint (*QS-****)	Continuous	60 - 180	0.05 - 0.8	0.05 - 0.3
			Interrupted	60 - 180	0.05 - 0.8	0.05 - 0.2
		HP chipbreaker (*QP-****-HP)	Light interrupted	60 - 180	0.05 - 0.2	0.05 - 0.2
			Interrupted	60 - 180	0.05 - 0.2	0.05 - 0.2

## GRADE

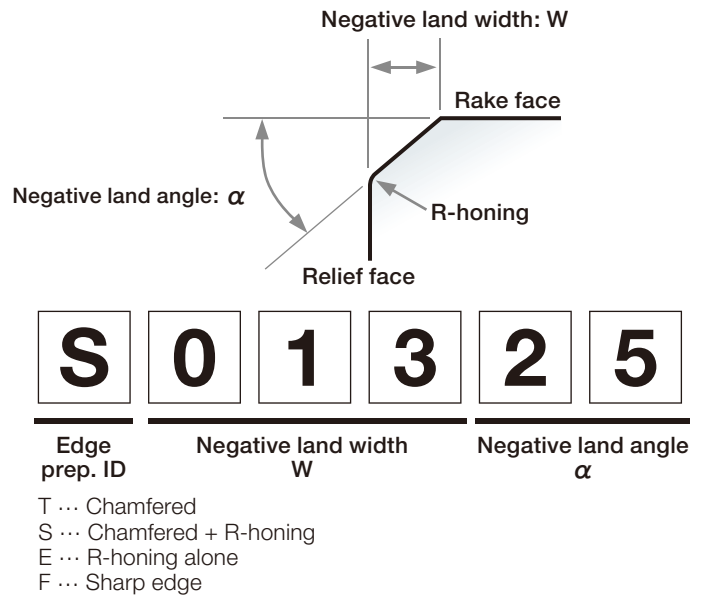
Application	Grade Application code	Microstructure	Hardness (Hv)	T.R.S (Gpa)
<b>H</b>	BXA20 (H20)		3500 - 3700	1.35 - 1.50

# 5 options of edge preparations covering various hard turning applications

## Edge preparations

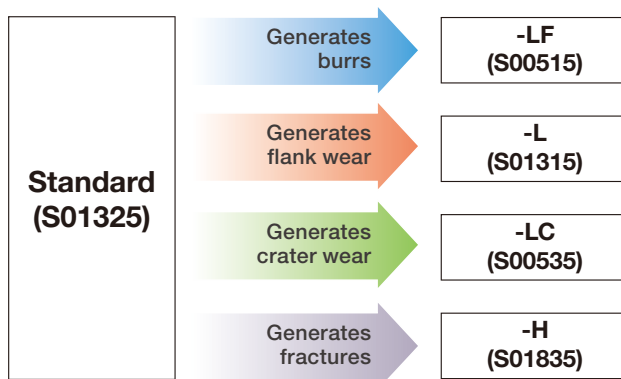
		Negative land angle $\alpha$ $\longrightarrow$ Large			
		$0^\circ$	$15^\circ$	$25^\circ$	$35^\circ$
Negative land width $W$ (mm) $\downarrow$ Wide	$\alpha$				
	0		-	-	-
	0.05	-	LF		LC
	0.13	-	L	Standard	
	0.18	-			H

BXA20 inserts



## Selections of edge preparations

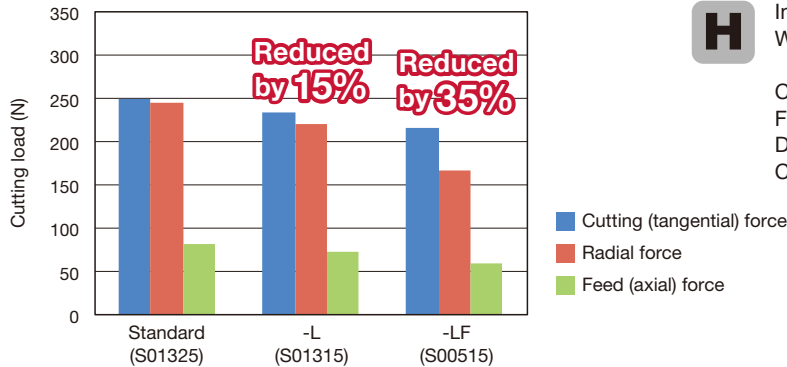
Allows you to select the most suited types of edge prep for your applications.





## Cutting loads

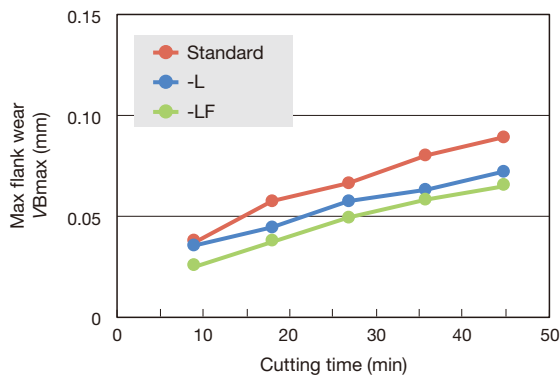
The -L and -LF provide reduced cutting loads over the standard type edge prep.



**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 / 15CrMo4 / 15CrMo5 (60HRC)  
 Cutting speed :  $V_c = 100$  m/min  
 Feed :  $f = 0.3$  mm/rev  
 Depth of cut :  $a_p = 0.2$  mm  
 Coolant : Dry

## Flank wear

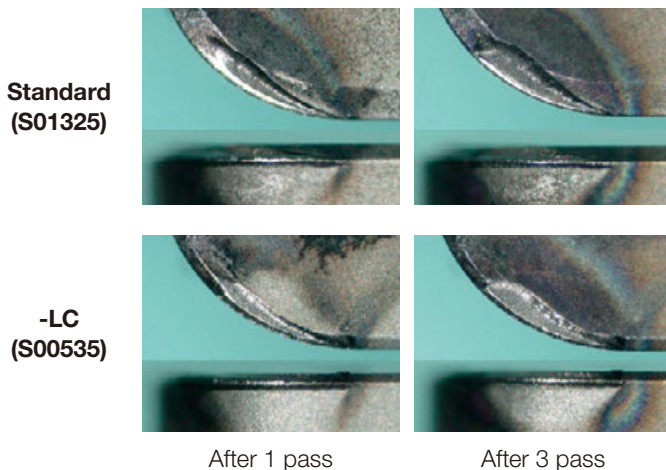
The -L and -LF provide reduced flank wear over the standard type edge prep.



**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 / 15CrMo4 / 15CrMo5 (60HRC)  
 Cutting speed :  $V_c = 130$  m/min  
 Feed :  $f = 0.15$  mm/rev  
 Depth of cut :  $a_p = 0.2$  mm  
 Coolant : Wet

## Crater wear

The -LC provides reduced crater wear over the standard type edge prep. Reduces insert fracture induced by crater wear.

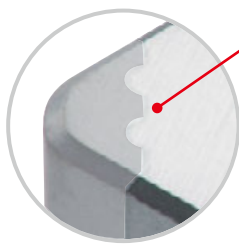


**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 / 15CrMo4 / 15CrMo5 (60HRC)  
 Cutting speed :  $V_c = 200$  m/min  
 Feed :  $f = 0.1$  mm/rev  
 Depth of cut :  $a_p = 0.2$  mm  
 Coolant : Dry

## WavyJoint for higher productivity

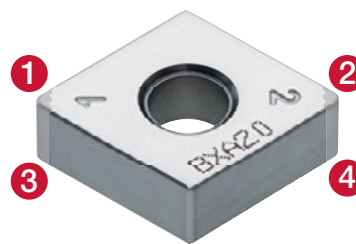
### New brazing technology for increased machining efficiency - "WavyJoint"

- A maximum depth of cut up to 0.8 mm  
→ Reduces the number of passes to increase productivity
- Innovative WavyJoint brazing technology  
→ Prevents the CBN tips from debrazing, eliminating abrupt insert fractures during demanding dry machining, while securing stable and predictable hard turning operations.



The "wavy" contact surface enhances the brazing strength.

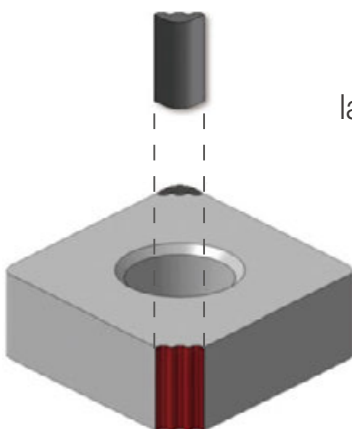
4 cutting edges



#### WavyJoint BXA20

Vs.

#### Standard

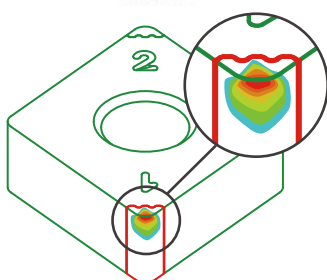


#### CBN tip size:

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

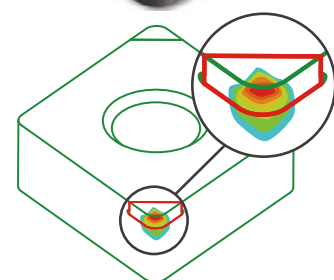
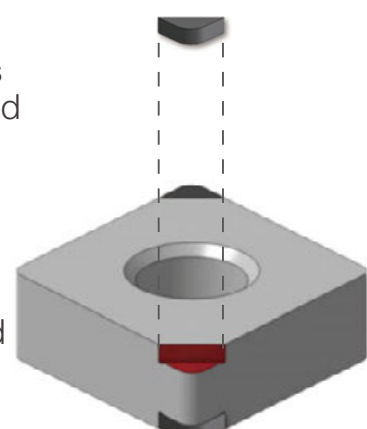
#### Brazing area:

Increased **160%** for enhanced brazing strength



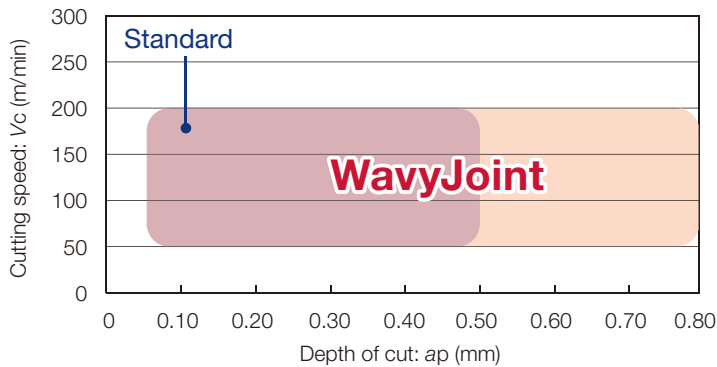
Temperature during machining is concentrated on the CBN tip, reducing temperature issues in the brazing zone.

Workpiece material : SCM420 / 20CrMo4 (60HRC)  
Cutting speed :  $V_c = 150$  m/min  
Feed :  $f = 0.20$  mm/rev  
Depth of cut :  $a_p = 0.75$  mm  
Coolant : Dry



## APPLICATION

### Hard Turning



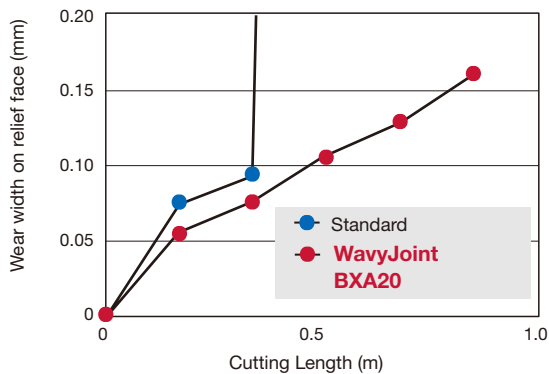
**H**

### WavyJoint BXA20

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

## CUTTING PERFORMANCE

### Effect of increased brazing area

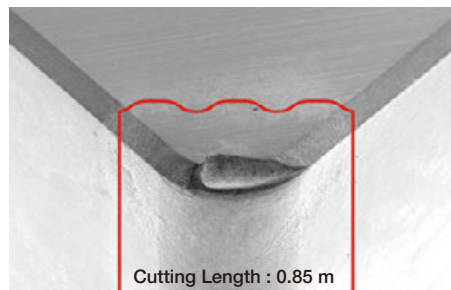


**H**

Insert : Standard = 2QP-CNGA120408 BXA20  
 WavyJoint = 4QS-CNGA120408 BXA20  
 Workpiece material : SCM420 / 20CrMo4 (60HRC)  $\phi$ 63 External turning  
 Cutting speed :  $V_c = 150$  m/min  
 Feed :  $f = 0.20$  mm/rev  
 Depth of cut :  $a_p = 0.75$  mm  
 Coolant : Dry



Standard



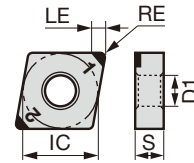
WavyJoint BXA20

The WavyJoint technology prevents the braze from overheating due to the increase in cutting edge temperature during dry cutting, greatly improving the brazing strength. The result: stable machining and extended tool life.

## INSERT NEGATIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

<b>P</b>	Steel								
<b>M</b>	Stainless								
<b>K</b>	Cast iron								
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloy								
<b>H</b>	Hard material	●	●						






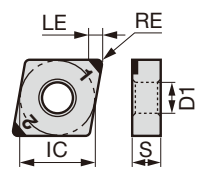
Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker
				LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC	H		
	<b>2QP-CNGA</b> 2QP-CNGA120404	●	2	2.3	0.4	12.7	4.76	5.16	○						
	2QP-CNGA120408	●	2	2.2	0.8	12.7	4.76	5.16	○						
	2QP-CNGA120412	●	2	2.4	1.2	12.7	4.76	5.16	○						
	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	○						
	<b>2QP-CNGA**-L</b> 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		○					
	<b>2QP-CNGA**-LF</b> 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			○				
	<b>2QP-CNGA**-LC</b> 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				○			
	<b>2QP-CNGA**-H</b> 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					○		
	<b>2QP-CNGA**WL</b> 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						○	
	<b>2QP-CNGM**-H*</b> 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							○
	<b>2QP-CNGM**WL-HP</b> 2QP-CNGM120408WL-HP	●	2	2.2	0.8	12.7	4.76	5.16						○	○

- ◐ : New product
- : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ◑ : Heavy interrupted cutting

Shape	Designation	B	X	A	20	Dimension (mm)					Edge prep.							
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper
	<b>4QS-CNGA120408</b>	●				4	1.5	0.8	12.7	4.76	5.16	○						
	<b>4QS-CNGA120412</b>	●				4	1.7	1.2	12.7	4.76	5.16	○						
	<b>4QS-CNGA120408-H</b>	●				4	1.5	0.8	12.7	4.76	5.16							○
	<b>4QS-CNGA120412-H</b>	●				4	1.7	1.2	12.7	4.76	5.16							○
	<b>4QS-CNGG120408-HM</b>	●				4	1.5	0.8	12.7	4.76	5.16							○
	<b>4QS-CNGG120412-HM</b>	●				4	1.7	1.2	12.7	4.76	5.16							○

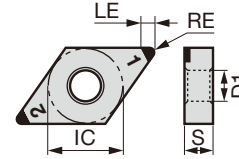


● : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
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- ✱ : Heavy interrupted cutting

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



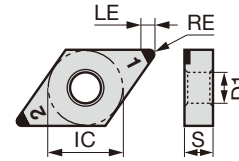
Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.				Wiper	Chipbreaker	
				LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC			H
	<b>2QP-DNGA</b> 2QP-DNGA110404	●	2	2.5	0.4	9.525	4.76	3.81	○						
	2QP-DNGA110408	●	2	2.1	0.8	9.525	4.76	3.81	○						
	2QP-DNGA110412	●	2	2.0	1.2	9.525	4.76	3.81	○						
	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	○						
	<b>2QP-DNGA**-L</b> 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		○					
	<b>2QP-DNGA**-LF</b> 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			○				
	<b>2QP-DNGA**-LC</b> 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				○			
	<b>2QP-DNGA**-H</b> 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					○		
	<b>2QP-DNGA**-WJ</b> 2QP-DNGA150404WJ	●	2	2.3	0.4	12.7	4.76	5.16						○	
	2QP-DNGA150408WJ	●	2	2.1	0.8	12.7	4.76	5.16						○	





● : New product   ● : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
- : Light interrupted cutting
- ✱ : Heavy interrupted cutting

<b>P</b>	Steel								
<b>M</b>	Stainless								
<b>K</b>	Cast iron								
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloy								
<b>H</b>	Hard material	●	●						



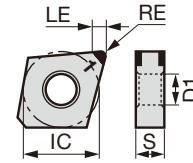
Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker	
				LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H			
	<b>2QP-DNGM**-H*</b> 2QP-DNGM150404-HP	●	2	2.5	0.4	12.7	4.76	5.16								○
	2QP-DNGM150408-HP	●	2	2.1	0.8	12.7	4.76	5.16								○
	2QP-DNGM150608-HP	●	2	2.1	0.8	12.7	6.35	5.16								○
	<b>4QS-DNGA</b> 4QS-DNGA150408	●	4	1.6	0.8	12.7	4.76	5.16	○							
	4QS-DNGA150412	●	4	1.6	1.2	12.7	4.76	5.16	○							
	<b>4QS-DNGA**-H</b> 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								○
	<b>4QS-DNGG**-HM</b> 4QS-DNGG150408-HM	●	4	1.6	0.8	12.7	4.76	5.16								○

● : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
- : Light interrupted cutting
- \* : Heavy interrupted cutting

<b>P</b>	Steel																				
<b>M</b>	Stainless																				
<b>K</b>	Cast iron																				
<b>N</b>	Non-ferrous																				
<b>S</b>	Superalloy																				
<b>H</b>	Hard material	●	●																		



Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker						
				LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC			H					
<b>2QP-GNGA</b> (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	○												
<b>2QP-GNGA**-L</b> (Corner angle 70°) 	*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		○											
<b>2QP-GNGA**-LF</b> (Corner angle 70°) 	*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			○										
<b>2QP-GNGA**-LC</b> (Corner angle 70°) 	*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													○
<b>2QP-GNGA**-H</b> (Corner angle 70°) 	*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													○
<b>2QP-GNGG**-HP</b> (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

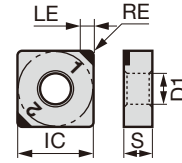
- : New product
- : Line up



## INSERT NEGATIVE TYPE

- : Continuous cutting
- c : Light interrupted cutting
- ✱ : Heavy interrupted cutting

<b>P</b>	Steel																			
<b>M</b>	Stainless																			
<b>K</b>	Cast iron																			
<b>N</b>	Non-ferrous																			
<b>S</b>	Superalloy																			
<b>H</b>	Hard material	●c																		



Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
				LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC			H				
	<b>2QP-SNGA</b> 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	○											
	<b>2QP-SNGA**-L</b> 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			○									
	<b>2QP-SNGA**-LF</b> 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				○								
	<b>2QP-SNGA**-H</b> 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												○

- : New product
- c : Line up

## INSERT NEGATIVE 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	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker
				LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC		
	<b>3QP-TNGA</b> 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	○						
	<b>3QP-TNGA**-L</b> 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		○					
	<b>3QP-TNGA**-LF</b> 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			○				
	<b>3QP-TNGA**-LC</b> 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				○			
	<b>3QP-TNGA**-H</b> 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					○		
	<b>3QP-TNGA**WG</b> 3QP-TNGA160404WG	●	3	2.4	0.4	9.525	4.76	3.81						○	
	3QP-TNGA160408WG	●	3	2.2	0.8	9.525	4.76	3.81						○	
	<b>3QP-TNGM**-H*</b> 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							○




- : New product
- : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
- : Light interrupted cutting
- ✱ : Heavy interrupted cutting

<b>P</b>	Steel																			
<b>M</b>	Stainless																			
<b>K</b>	Cast iron																			
<b>N</b>	Non-ferrous																			
<b>S</b>	Superalloy																			
<b>H</b>	Hard material	●	●																	



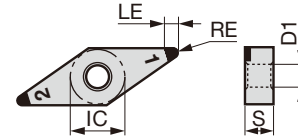
Shape	Designation	BXA20				Dimension (mm)					Edge prep.					Wiper	Chipbreaker			
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL			LC	H	
	<b>6QS-TNGA</b> 6QS-TNGA160408	●				6	1.6	0.8	9.525	4.76	3.81	○								
	6QS-TNGA160412	●				6	1.8	1.2	9.525	4.76	3.81	○								
	<b>6QS-TNGA**-H</b> 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									○
	<b>6QS-TNGG**-HM</b> 6QS-TNGG160408-HM	●				6	1.6	0.8	9.525	4.76	3.81									○

● : Line up

## INSERT NEGATIVE TYPE

- : Continuous cutting
- : Light interrupted cutting
- \* : Heavy interrupted cutting

<b>P</b>	Steel																			
<b>M</b>	Stainless																			
<b>K</b>	Cast iron																			
<b>N</b>	Non-ferrous																			
<b>S</b>	Superalloy																			
<b>H</b>	Hard material	●	●																	



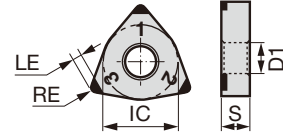
Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
				LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC			H				
	<b>2QP-VNGA</b> 2QP-VNGA160404	●	2	3.1	0.4	9.525	4.76	3.81	○											
	2QP-VNGA160408	●	2	2.2	0.8	9.525	4.76	3.81	○											
	2QP-VNGA160412	●	2	3.0	1.2	9.525	4.76	3.81	○											
	<b>2QP-VNGA**-L</b> 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		○										
	<b>2QP-VNGA**-LF</b> 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			○									
	<b>2QP-VNGA**-LC</b> 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												○
	<b>2QP-VNGA**-H</b> 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												○
	<b>2QP-VNGM**-H*</b> 2QP-VNGM160408-HP	●	2	2.2	0.8	9.525	4.76	3.81												○
	<b>4QS-VNGA</b> 4QS-VNGA160408	●	4	1.7	0.8	9.525	4.76	3.81	○											
	<b>4QS-VNGA**-H</b> 4QS-VNGA160408-H	●	4	1.7	0.8	9.525	4.76	3.81												○
	<b>4QS-VNGG**-HM</b> 4QS-VNGG160408-HM	●	4	1.7	0.8	9.525	4.76	3.81												○

- : New product
- : Line up

- : Continuous cutting
- : Light interrupted cutting
- \* : Heavy interrupted cutting

## INSERT NEGATIVE TYPE

<b>P</b>	Steel								
<b>M</b>	Stainless								
<b>K</b>	Cast iron								
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloy								
<b>H</b>	Hard material	●	●						



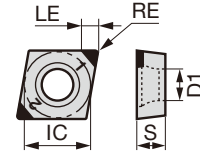
Shape	Designation	BXA20				Dimension (mm)					Edge prep.							
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper
	<b>3QP-WNGA</b> 3QP-WNGA080404	●				3	2.3	0.4	12.7	4.76	5.16	○						
	3QP-WNGA080408	●				3	2.2	0.8	12.7	4.76	5.16	○						
	3QP-WNGA080412	●				3	2.4	1.2	12.7	4.76	5.16	○						
	<b>3QP-WNGA**-L</b> 3QP-WNGA080408-L	●				3	2.2	0.8	12.7	4.76	5.16		○					
	<b>3QP-WNGA**-LF</b> 3QP-WNGA080408-LF	●				3	2.2	0.8	12.7	4.76	5.16			○				
	<b>3QP-WNGA**-H</b> 3QP-WNGA080408-H	●				3	2.2	0.8	12.7	4.76	5.16						○	
	<b>3QP-WNGA**-WL</b> 3QP-WNGA080408WL	●				3	2.2	0.8	12.7	4.76	5.16							○
	<b>6QS-WNGA</b> 6QS-WNGA080408	●				6	1.5	0.8	12.7	4.76	5.16	○						
	<b>6QS-WNGA**-H</b> 6QS-WNGA080408-H	●				6	1.5	0.8	12.7	4.76	5.16							○

- : New product
- : Line up

## 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	●	◐																	



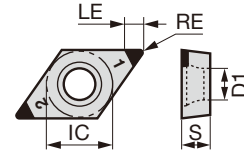
Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
				LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC			H				
	2QP-CCGW060204	●	2	2.3	0.4	6.35	2.38	2.8	○											
	2QP-CCGW060208	●	2	2.2	0.8	6.35	2.38	2.8	○											
	2QP-CCGW09T304	●	2	2.3	0.4	9.525	3.97	4.4	○											
	2QP-CCGW09T308	●	2	2.2	0.8	9.525	3.97	4.4	○											
	2QP-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-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-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-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-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-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-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	○											

- : New product
- ◐ : Line up

## INSERT POSITIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

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



Shape	Designation	BXA20	No. of corners	Dimension (mm)					Edge prep.				Wiper	Chipbreaker	
				LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC			H
	<b>2QP-DCGW</b> 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	2.1	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	○						
	<b>2QP-DCGW**-L</b> 2QP-DCGW070204-L	●	2	2.5	0.4	6.35	2.38	2.8		○					
	2QP-DCGW070208-L	●	2	2.1	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		○					
	<b>2QP-DCGW**-LF</b> 2QP-DCGW070204-LF	●	2	2.5	0.4	6.35	2.38	2.8			○				
	2QP-DCGW070208-LF	●	2	2.1	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			○				
	<b>2QP-DCGW**-LC</b> 2QP-DCGW070204-LC	●	2	2.5	0.4	6.35	2.38	2.8				○			
	2QP-DCGW070208-LC	●	2	2.1	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				○			
	<b>2QP-DCGW**-H</b> 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					○		
	<b>2QP-DCGT**-HP</b> 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							○

- : New product
- ◐ : Line up

## 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	BXA20	No. of corners	Dimension (mm)					Edge prep.				Wiper	Chipbreaker	
				LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC			H
	<b>3QP-TPGW</b> 3QP-TPGW080204	●	3	2.2	0.4	4.76	2.38	2.3	○						
	3QP-TPGW080208	●	3	1.9	0.8	4.76	2.38	2.3	○						
	3QP-TPGW090204	●	3	2.2	0.4	5.56	2.38	2.5	○						
	3QP-TPGW090208	●	3	1.9	0.8	5.56	2.38	2.5	○						
	3QP-TPGW110204	●	3	2.2	0.4	6.35	2.38	2.8	○						
	3QP-TPGW110208	●	3	1.9	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	1.9	0.8	6.35	3.18	3.4	○						
	3QP-TPGW130304	●	3	2.2	0.4	7.94	3.18	3.4	○						
	3QP-TPGW130308	●	3	1.9	0.8	7.94	3.18	3.4	○						
	3QP-TPGW16T304	●	3	2.2	0.4	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	○						
	<b>3QP-TPGW**-L</b> 3QP-TPGW110304-L	●	3	2.2	0.4	6.35	3.18	3.4		○					
	3QP-TPGW110308-L	●	3	1.9	0.8	6.35	3.18	3.4		○					
	<b>3QP-TPGW**-LF</b> 3QP-TPGW110304-LF	●	3	2.2	0.4	6.35	3.18	3.4			○				
	3QP-TPGW110308-LF	●	3	1.9	0.8	6.35	3.18	3.4			○				
	<b>3QP-TPGW**-LC</b> 3QP-TPGW110304-LC	●	3	2.2	0.4	6.35	3.18	3.4				○			
	3QP-TPGW110308-LC	●	3	1.9	0.8	6.35	3.18	3.4				○			
	<b>3QP-TPGW**-H</b> 3QP-TPGW110304-H	●	3	2.2	0.4	6.35	3.18	3.4					○		
	3QP-TPGW110308-H	●	3	1.9	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					○		
	<b>3QP-TPGT</b> 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							○
	<b>3QP-TCGW</b> 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	4.4	○						
	3QP-TCGW16T308	●	3	1.9	0.8	9.525	3.97	4.4	○						

● : New product   ● : Line up

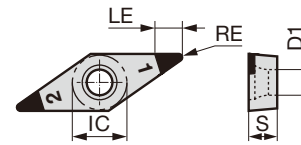


## INSERT

### POSITIVE TYPE

● : Continuous cutting  
 ● : Light interrupted cutting  
 \* : Heavy interrupted cutting

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



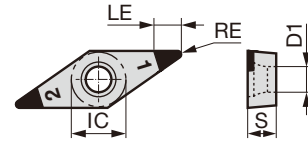
Shape	Designation	BXA20	Dimension (mm)					Edge prep.				Wiper	Chipbreaker					
			No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge								
										L	LFLC			H				
	<b>2QP-VBGW</b>		●	2	3.1	0.4	6.35	2.38	2.8	○								
	2QP-VBGW110204																	
	2QP-VBGW110208																	
	2QP-VBGW110304																	
	2QP-VBGW110308																	
	2QP-VBGW160404																	
	2QP-VBGW160408																	
	2QP-VBGW160412			2	3.0	1.2	9.525	4.76	4.4	○								
	<b>2QP-VBGW**-L</b>		●	2	3.1	0.4	6.35	3.18	2.8	○								
	2QP-VBGW110304-L																	
	2QP-VBGW110308-L																	
	2QP-VBGW160404-L																	
	2QP-VBGW160408-L			2	2.2	0.8	9.525	4.76	4.4	○								
	<b>2QP-VBGW**-LF</b>		●	2	3.1	0.4	6.35	3.18	2.8	○								
	2QP-VBGW110304-LF																	
	2QP-VBGW110308-LF																	
	2QP-VBGW160404-LF																	
	2QP-VBGW160408-LF			2	2.2	0.8	9.525	4.76	4.4	○								
	<b>2QP-VBGW**-LC</b>		●	2	3.1	0.4	6.35	3.18	2.8	○								
	2QP-VBGW110304-LC																	
	2QP-VBGW110308-LC																	
	2QP-VBGW160404-LC																	
	2QP-VBGW160408-LC			2	2.2	0.8	9.525	4.76	4.4	○								
	<b>2QP-VBGW**-H</b>		●	2	3.1	0.4	9.525	4.76	4.4	○								
	2QP-VBGW160404-H																	
	2QP-VBGW160408-H			2	2.2	0.8	9.525	4.76	4.4	○								

● : New product  
 ● : Line up

## INSERT POSITIVE TYPE

- : Continuous cutting
- c : Light interrupted cutting
- ✳ : Heavy interrupted cutting

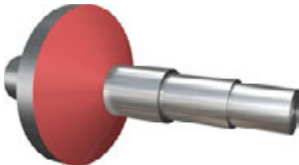

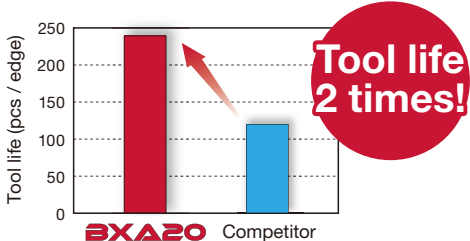
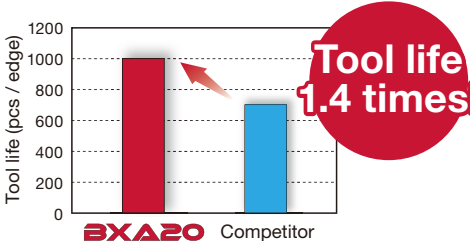


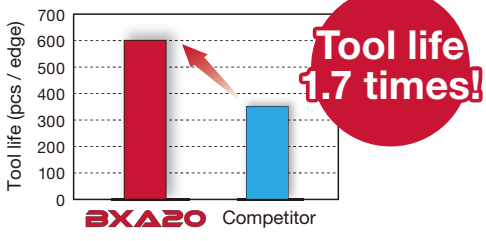
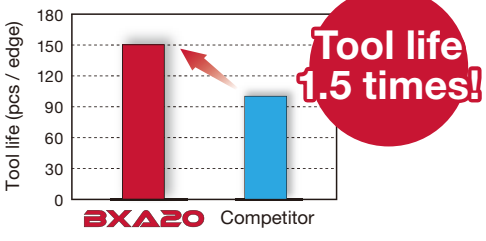
P	Steel																	
M	Stainless																	
K	Cast iron																	
N	Non-ferrous																	
S	Superalloy																	
H	Hard material	●c																



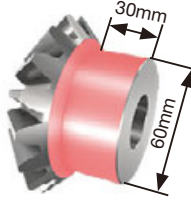
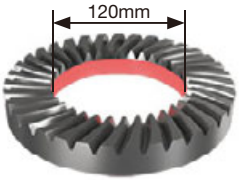
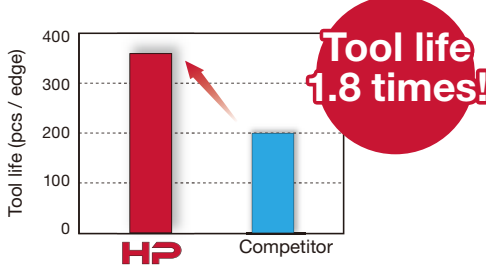
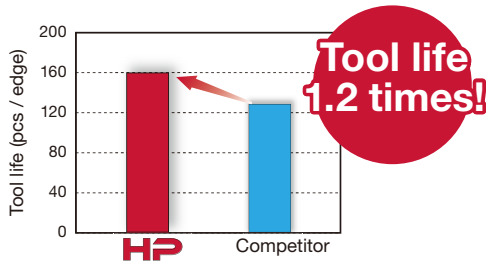
Shape	Designation	BXA20	Dimension (mm)							Edge prep.					Wiper	Chipbreaker		
			No. of corners	LE	RE	IC	S	D1	Standard Sharp edge	L	LFLC	H						
	<b>2QP-VBGT**</b> -HP 2QP-VBGT110304-HP	●	2	3	0.4	6.35	3.18	2.8										○
	2QP-VBGT110308-HP	●	2	2.2	0.8	6.35	3.18	2.8										○
	2QP-VBGT160404-HP	●	2	3	0.4	9.525	4.76	4.4										○
	2QP-VBGT160408-HP	●	2	2.2	0.8	9.525	4.76	4.4										○
	<b>2QP-VCGW</b> 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	○									
	<b>2QP-VCGW**-H</b> 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										○

- : New product
- c : Line up


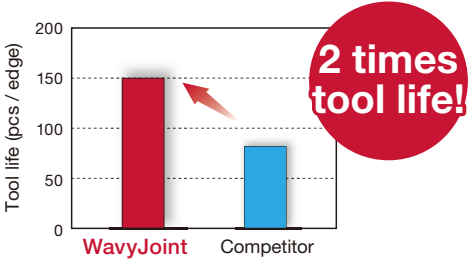
## PRACTICAL EXAMPLES

Workpiece type		Automotive parts (CVT)	Automotive parts (CVJ)
Insert		2QP-DNGA150412	2QP-DNGA150420
Grade		BXA20	BXA20
Workpiece material		SCr420H (59HRC)	SCr420H (60HRC)
		 <b>H</b>	 <b>H</b>
Cutting conditions	Cutting speed: $V_c$ (m/min)	170	150
	Feed : $f$ (mm/rev)	0.3	0.25
	Depth of cut : $a_p$ (mm)	0.1	0.2
	Coolant	Wet	Wet
Results		 <p><b>Tool life 2 times!</b></p> <p>Tool life is doubled due to higher wear resistance.</p>	 <p><b>Tool life 1.4 times!</b></p> <p>The operation is stable with BXA20 even in interrupted machining.</p>
Workpiece type		Automotive parts (Poppet)	Machine parts
Insert		2QP-CCGW09T304	2QP-DNGA150404
Grade		BXA20	BXA20
Workpiece material		SCr415H (58HRC)	SNCM420H (60HRC)
		 <b>H</b>	 <b>H</b>
Cutting conditions	Cutting speed: $V_c$ (m/min)	130	150
	Feed : $f$ (mm/rev)	0.04	0.07
	Depth of cut : $a_p$ (mm)	0.2	0.15
	Coolant	Wet	Wet
Results		 <p><b>Tool life 1.7 times!</b></p> <p>BXA20 provides stable tool life as only normal wear occurs without chipping.</p>	 <p><b>Tool life 1.5 times!</b></p> <p>Surface roughness is minimized with BXA20.</p>

## PRACTICAL EXAMPLES

Workpiece type	Bevel gear	Gear Wheel
Insert	2QP-CNGM120408-HP	2QP-CNGM120408WL-HP
Grade	BXA20	BXA20
Workpiece material	JIS SCM420 (HRC58)	JIS SCM420 (HRC58)
		
Cutting conditions	Cutting speed: $V_c$ (m/min)	160
	Feed : $f$ (mm/rev)	0.10
	Depth of cut : $a_p$ (mm)	0.15
	Coolant	Wet
Results	 <p>Competitor's inserts had a short tool life because of chip re-cutting. The -HP chipbreaker insert solved chip entanglement issues, prolonging tool life and achieving excellent surface finish quality.</p>	 <p>The -HP chipbreaker insert with wiper provided good chip flow and machined surface.</p>

## PRACTICAL EXAMPLES

<b>Workpiece type</b>		<b>Automotive part</b>
<b>Insert</b>		4QS-CNGA120412
<b>Grade</b>		BXA20
<b>Workpiece material</b>		SCM420 / 20CrMo4 (60HRC)
		 <b>H</b>
<b>Cutting conditions</b>	<b>Cutting speed : Vc (m/min)</b>	100
	<b>Feed : f (mm/rev)</b>	0.1 - 0.2
	<b>Depth of cut : ap (mm)</b>	0.7 - 1.0
	<b>Coolant</b>	Dry
<b>Results</b>		 <p><b>2 times tool life!</b></p> <p>The WavyJoint technology insert successfully machined 150 pcs/corner, almost twice that of the competitor's, without CBN tip failure.</p>

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# BXA20

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Tungaloy Report No. 511S1-G

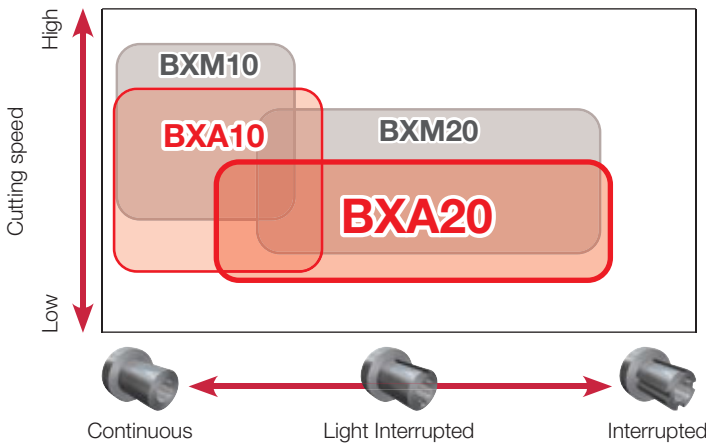
## Expansion of 0.1 and 0.2 mm corner radius insert



# Ideal for machining small corner radii of hardened steel parts

## APPLICATION AREA

The best suitable grade can be selected for your application requirements



### BXA10

First choice for continuous to light interrupted cuts  
For  $V_c = 230$  m/min or less

### BXA20

First choice for light to heavy interrupted cuts  
For  $V_c = 180$  m/min or less

### BXM10

Complementary grade for continuous to light interrupted cuts  
For extremely high cutting speeds of  $V_c = 300$  m/min

### BXM20

Complementary grade for light to heavy interrupted cuts  
For high cutting speeds of  $V_c = 200$  m/min

## INSERT LINEUP

### Negative type

Shape	Corner R						
	0.2	0.4	0.8	1.2	1.6	2	2.4
<b>C</b> 	●	●	●	●	●	●	●
<b>D</b> 	●	●	●	●	●	●	●
<b>T</b> 	●	●	●	●	●	●	●
<b>V</b> 	●	●	●	●	-	-	-
<b>G</b> 	●	●	●	●	-	-	-

### Positive type

Shape	Corner R			
	0.1	0.2	0.4	0.8
<b>C</b> 	-	●	●	●
<b>D</b> 	●	●	●	●
<b>T</b> 	-	●	●	●
<b>V</b> 	●	●	●	●

●: New

## INSERT NEGATIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

Shape	Designation	Material		Dimension (mm)						Edge prep.					Wiper	Chipbreaker	
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H			
		Sharp edge															
<b>2QP-CNGA**</b>	<b>2QP-CNGA120402</b>	●	●	2	2.3	0.2	12.7	4.76	5.16	○							
	2QP-CNGA120402-L	●	●	2	2.3	0.2	12.7	4.76	5.16		○						
	2QP-CNGA120402-LF	●	●	2	2.3	0.2	12.7	4.76	5.16			○					
	2QP-CNGA120402-LC	●	●	2	2.3	0.2	12.7	4.76	5.16				○				

Shape	Designation	Material		Dimension (mm)						Edge prep.					Wiper	Chipbreaker	
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H			
		Sharp edge															
<b>2QP-DNGA**</b>	<b>2QP-DNGA150402</b>	●	●	2	2.7	0.2	12.7	4.76	5.16	○							
	2QP-DNGA150402-L	●	●	2	2.7	0.2	12.7	4.76	5.16		○						
	2QP-DNGA150402-LF	●	●	2	2.7	0.2	12.7	4.76	5.16			○					
	2QP-DNGA150402-LC	●	●	2	2.7	0.2	12.7	4.76	5.16				○				

Shape	Designation	Material		Dimension (mm)						Edge prep.					Wiper	Chipbreaker	
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H			
		Sharp edge															
<b>2QP-GNGA**</b>	<b>*2QP-GNGA120402</b>	●	●	2	2.2	0.2	12.7	4.76	5.16	○							
	*2QP-GNGA120402-L	●	●	2	2.2	0.2	12.7	4.76	5.16		○						
	*2QP-GNGA120402-LF	●	●	2	2.2	0.2	12.7	4.76	5.16			○					
	*2QP-GNGA120402-LC	●	●	2	2.2	0.2	12.7	4.76	5.16				○				

\* Tungaloy's standard

● : New

## INSERT NEGATIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

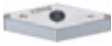
Shape	Designation	Dimension (mm)						Edge prep.					Wiper	Chipbreaker		
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L			LFLC	H
<b>3QP-TNGA**</b>	<b>3QP-TNGA160402</b>	●	◐	3	2.3	0.2	9.525	4.76	3.81	○						
	3QP-TNGA160402-L	●	◐	3	2.3	0.2	9.525	4.76	3.81		○					
	3QP-TNGA160402-LF	●	◐	3	2.3	0.2	9.525	4.76	3.81			○				
	3QP-TNGA160402-LC	●	◐	3	2.3	0.2	9.525	4.76	3.81				○			



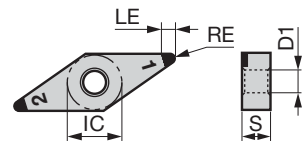
P	Steel																
M	Stainless																
K	Cast iron																
N	Non-ferrous																
S	Superalloy																
H	Hard material	●	◐														



Shape	Designation	Dimension (mm)						Edge prep.					Wiper	Chipbreaker		
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L			LFLC	H
<b>2QP-VNGA**</b>	<b>2QP-VNGA160402</b>	●	◐	2	3.5	0.2	9.525	4.76	3.81	○						
	2QP-VNGA160402-L	●	◐	2	3.5	0.2	9.525	4.76	3.81		○					
	2QP-VNGA160402-LF	●	◐	2	3.5	0.2	9.525	4.76	3.81			○				
	2QP-VNGA160402-LC	●	◐	2	3.5	0.2	9.525	4.76	3.81				○			



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



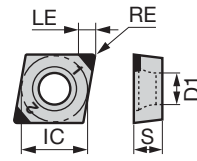
● : New

## INSERT POSITIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting



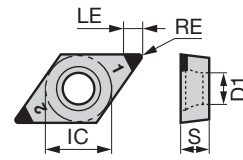
P	Steel																			
M	Stainless																			
K	Cast iron																			
N	Non-ferrous																			
S	Superalloy																			
H	Hard material	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



Shape	Designation	BXA10	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
					LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC	H							
<b>2QP-CCGW**</b>	<b>2QP-CCGW060202</b>	●	●	2	2.3	0.2	6.35	2.38	2.8	○											
	2QP-CCGW060202-L	●	●	2	2.3	0.2	6.35	2.38	2.8		○										
	2QP-CCGW060202-LF	●	●	2	2.3	0.2	6.35	2.38	2.8			○									
	2QP-CCGW060202-LC	●	●	2	2.3	0.2	6.35	2.38	2.8				○								
	<b>2QP-CCGW09T302</b>	●	●	2	2.3	0.2	9.525	3.97	4.4	○											
	2QP-CCGW09T302-L	●	●	2	2.3	0.2	9.525	3.97	4.4		○										
	2QP-CCGW09T302-LF	●	●	2	2.3	0.2	9.525	3.97	4.4			○									
	2QP-CCGW09T302-LC	●	●	2	2.3	0.2	9.525	3.97	4.4				○								
	2QP-CCGW09T302-H	●	●	2	2.3	0.2	9.525	3.97	4.4					○							
<b>2QP-CPGW**</b>	<b>2QP-CPGW080202</b>	●	●	2	2.3	0.2	7.94	2.38	3.4	○											
	2QP-CPGW090302	●	●	2	2.3	0.2	9.525	3.18	4.4	○											



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





Shape	Designation	BXA10	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
					LE	RE	IC	S	D1	Standard Sharp edge	L	LF	LC	H							
<b>2QP-DCGW**</b>	<b>2QP-DCGW070202-L</b>	●	●	2	2.7	0.2	6.35	2.38	2.8		○										
	2QP-DCGW070202-LF	●	●	2	2.7	0.2	6.35	2.38	2.8			○									
	2QP-DCGW070202-LC	●	●	2	2.7	0.2	6.35	2.38	2.8				○								
	<b>2QP-DCGW11T301</b>	●	●	2	2.8	0.1	9.525	3.97	4.4	○											
	2QP-DCGW11T302-L	●	●	2	2.7	0.2	9.525	3.97	4.4		○										
	2QP-DCGW11T302-LF	●	●	2	2.7	0.2	9.525	3.97	4.4			○									
	2QP-DCGW11T302-LC	●	●	2	2.7	0.2	9.525	3.97	4.4				○								
	2QP-DCGW11T302-H	●	●	2	2.7	0.2	9.525	3.97	4.4					○							

● : New

## INSERT POSITIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

Shape	Designation	Material		Dimension (mm)						Edge prep.							
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H	Wiper	Chipbreaker	
										Sharp edge							
		P Steel															
		M Stainless															
		K Cast iron															
		N Non-ferrous															
		S Superalloy															
		H Hard material	●	●													
	<b>3QP-TPGW**</b>	<b>3QP-TPGW080202</b>	●	●	3	2.3	0.2	4.76	2.38	2.3	○						
		<b>3QP-TPGW090202</b>	●	●	3	2.3	0.2	5.56	2.38	2.5	○						
		<b>3QP-TPGW110202</b>	●	●	3	2.3	0.2	6.35	2.38	2.8	○						
		<b>3QP-TPGW110302-L</b>	●	●	3	2.3	0.2	6.35	3.18	3.4		○					
	<b>3QP-TPGW110302-LF</b>	●	●	3	2.3	0.2	6.35	3.18	3.4			○					
	<b>3QP-TPGW110302-LC</b>	●	●	3	2.3	0.2	6.35	3.18	3.4				○				
	<b>3QP-TPGW110302-H</b>	●	●	3	2.3	0.2	6.35	3.18	3.4					○			
	<b>3QP-TPGW130302</b>	●	●	3	2.3	0.2	7.94	3.18	3.4	○							
	<b>3QP-TPGW16T302</b>	●	●	3	2.3	0.2	9.525	3.97	4.4	○							
	<b>3QP-TPGW160402</b>	●	●	3	2.3	0.2	9.525	4.76	4.4	○							
	<b>3QP-TPGW160402-H</b>	●	●	3	2.3	0.2	9.525	4.76	4.4					○			

Shape	Designation	Material		Dimension (mm)						Edge prep.						
		BXA10	BXA20	No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H	Wiper	Chipbreaker
										Sharp edge						
		P Steel														
		M Stainless														
		K Cast iron														
		N Non-ferrous														
	S Superalloy															
	H Hard material	●	●													
<b>3QP-TCGW**</b>	<b>3QP-TCGW090202</b>	●	●	3	2.3	0.2	5.56	2.38	2.5	○						
	<b>3QP-TCGW110202</b>	●	●	3	2.3	0.2	6.35	2.38	2.8	○						
	<b>3QP-TCGW16T302</b>	●	●	3	2.3	0.2	9.525	3.97	4.4	○						

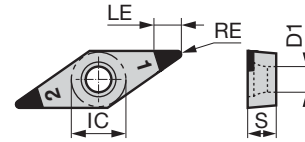
● : New

## INSERT POSITIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting



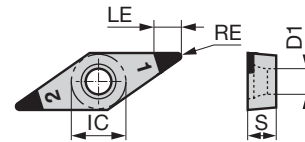
P	Steel																			
M	Stainless																			
K	Cast iron																			
N	Non-ferrous																			
S	Superalloy																			
H	Hard material	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



Shape	Designation	BXA10	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker					
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC			H				
<b>2QP-VBGW**</b>	<b>2QP-VBGW110202</b>	●	●	2	3.5	0.2	6.35	2.38	2.8	○											
	<b>2QP-VBGW110301</b>	●	●	2	3.7	0.1	6.35	3.18	2.8	○											
	<b>2QP-VBGW110302</b>	●	●	2	3.5	0.2	6.35	3.18	2.8	○											
	<b>2QP-VBGW110302-L</b>	●	●	2	3.5	0.2	6.35	3.18	2.8			○									
	<b>2QP-VBGW110302-LF</b>	●	●	2	3.5	0.2	6.35	3.18	2.8				○								
	<b>2QP-VBGW110302-LC</b>	●	●	2	3.5	0.2	6.35	3.18	2.8					○							
	<b>2QP-VBGW160402</b>	●	●	2	3.5	0.2	9.525	4.76	4.4	○											
	<b>2QP-VBGW160402-L</b>	●	●	2	3.5	0.2	9.525	4.76	4.4			○									
	<b>2QP-VBGW160402-LF</b>	●	●	2	3.5	0.2	9.525	4.76	4.4				○								
	<b>2QP-VBGW160402-LC</b>	●	●	2	3.5	0.2	9.525	4.76	4.4					○							
	<b>2QP-VBGW160402-H</b>		●	2	3.5	0.2	9.525	4.76	4.4											○	



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



Shape	Designation	BXA10	BXA20	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker				
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC			H			
<b>2QP-VCGW**</b>	<b>2QP-VCGW080202</b>	●	●	2	3.5	0.2	4.76	2.38	2.3	○										
	<b>2QP-VCGW160402</b>	●	●	2	3.5	0.2	9.525	4.76	4.4	○										
	<b>2QP-VCGW160402-H</b>	●	●	2	3.5	0.2	9.525	4.76	4.4											○

● : New

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