

TurnLine

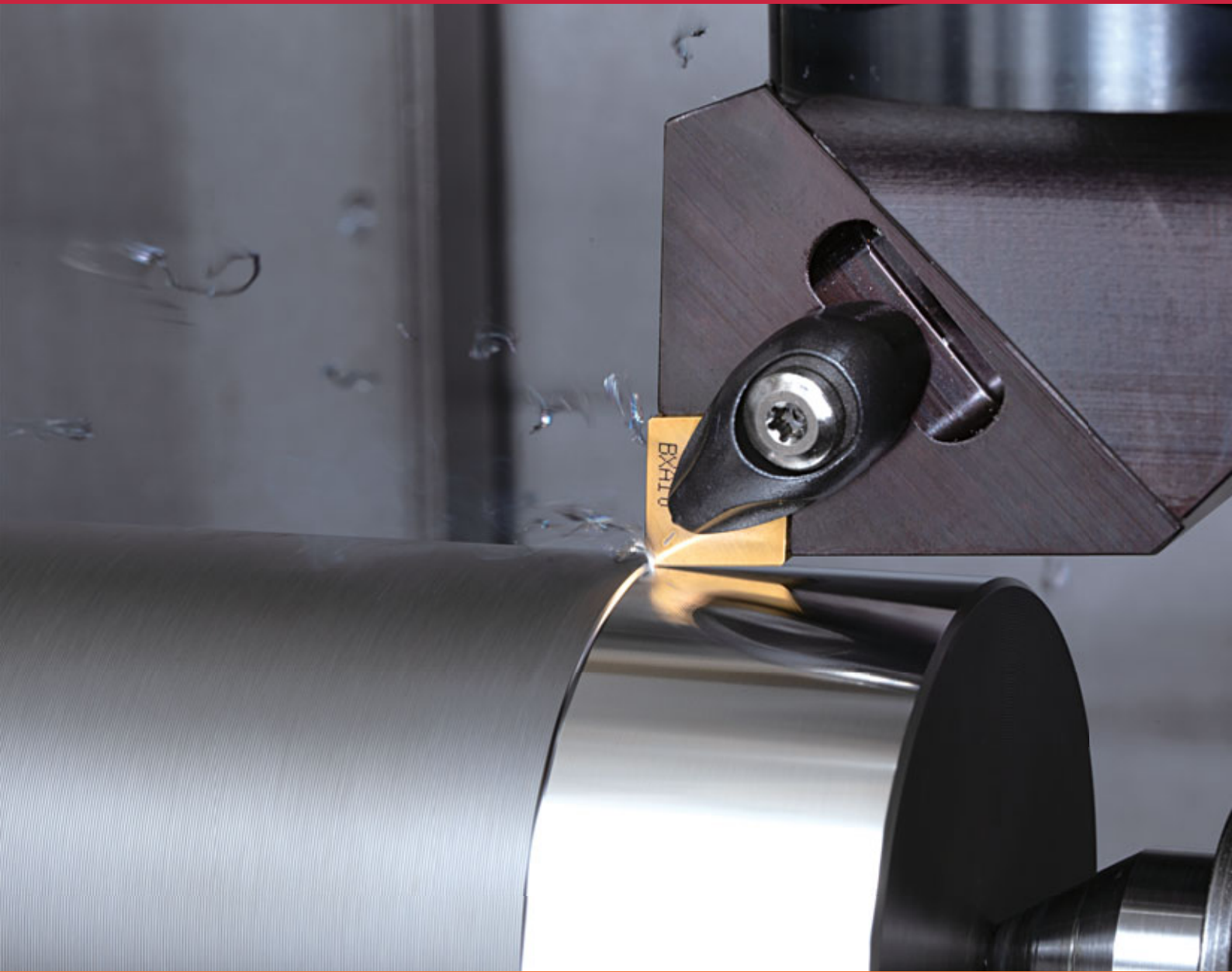


**BXA10**

www.tungaloy.com

Tungaloy Report No. 537-G

**Coated CBN grade** with a whole new level of cutting performance for hardened steel



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

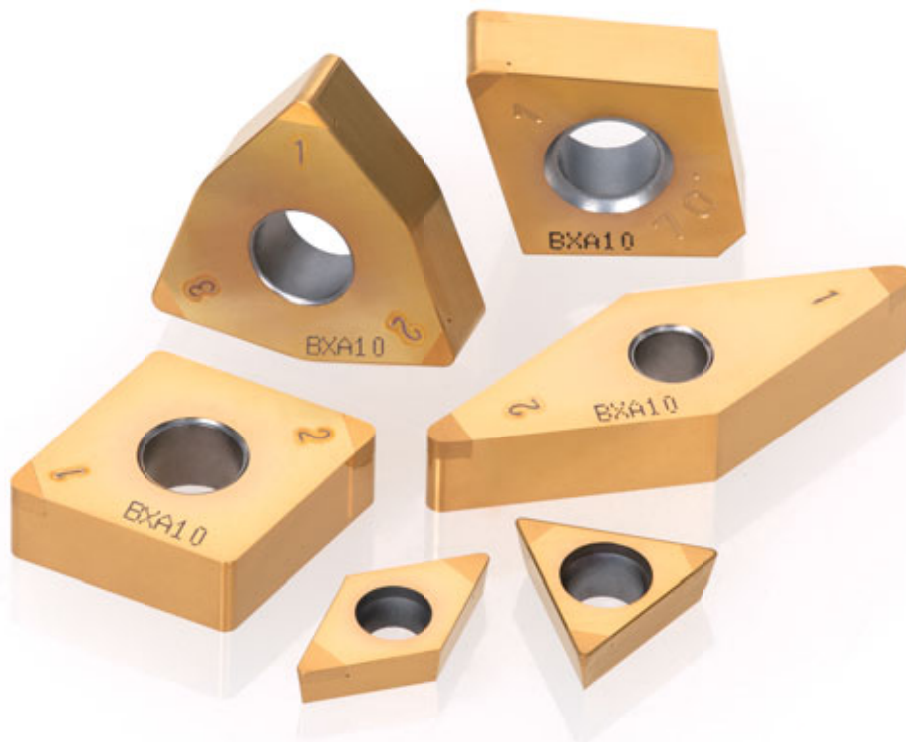


ACCELERATED MACHINING



TurnLine

**BXA10**  
TUNGALOY

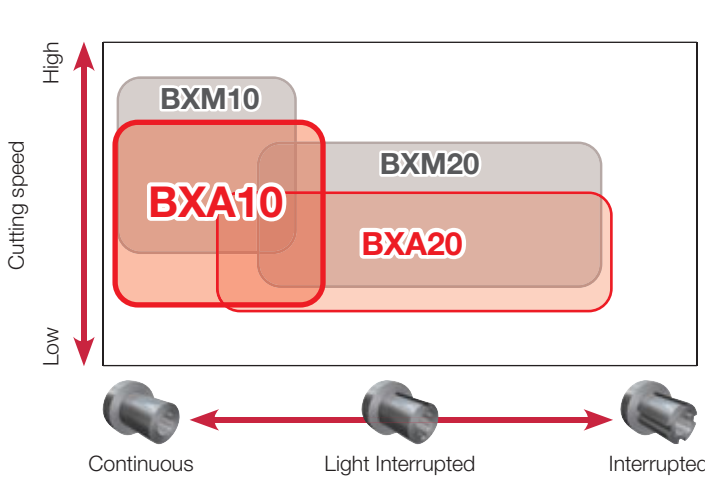


**With new BXA10 available in the series,** a wider range of continuous and light interrupted cuts are now covered along with versatile BXA20 grade

# Incredible reliability in hardened steel turning

## APPLICATION AREA

The best suitable grade can be selected for your application requirements



**New**

### 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

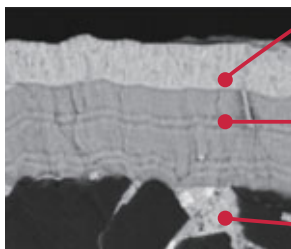
Complementary grade for continuous to light interrupted cuts  
For extremely high cutting speeds of  $V_c = 300$  m/min

### BXM20

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

## GRADE PROPERTIES

### BXA10



TiCN layer with high thermal stability and wear resistance

TiAlN layer with good adhesion and resistance to delamination and chipping

Dedicated CBN substrate with excellent flank wear and crater wear resistance

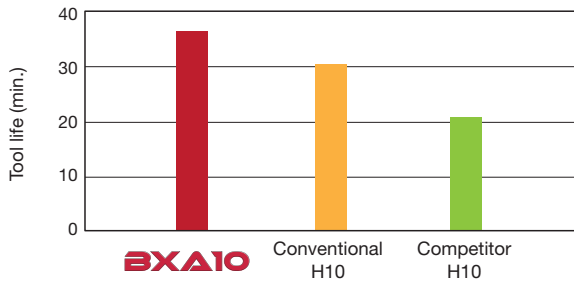
## STANDARD CUTTING CONDITIONS

ISO	Grade	Workpiece condition	Cutting speed $V_c$ (m/min)	Depth of cut $a_p$ (mm)	Feed $f$ (mm/rev)
<b>H</b>	<b>BXA10</b>	Continuous	100 - 230	0.05 - 0.5	0.05 - 0.3
		Light interrupted	100 - 230	0.05 - 0.3	0.05 - 0.2
	<b>BXA20</b>	Continuous	60 - 180	0.05 - 0.5	0.05 - 0.3
		Interrupted	60 - 180	0.05 - 0.3	0.05 - 0.2

## CUTTING PERFORMANCE

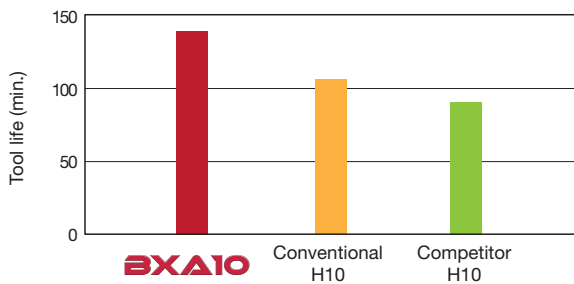
**BXA10**

## External turning (continuous cutting)

**H**

Insert : CNGA120408  
 Workpiece material : SCM415 (Alloy steel, 58-60HRC)  
 Cutting speed :  $V_c = 200$  m/min  
 Feed :  $f = 0.15$  mm/rev  
 Depth of cut :  $a_p = 0.15$  mm  
 Coolant : Wet

## Face turning (light interrupted cutting)

**H**

Insert : CNGA120408  
 Workpiece material : SCM420 / 18CrMo4 (59-61HRC)  
 Cutting speed :  $V_c = 130$  m/min  
 Feed :  $f = 0.15$  mm/rev  
 Depth of cut :  $a_p = 0.15$  mm  
 Coolant : Wet

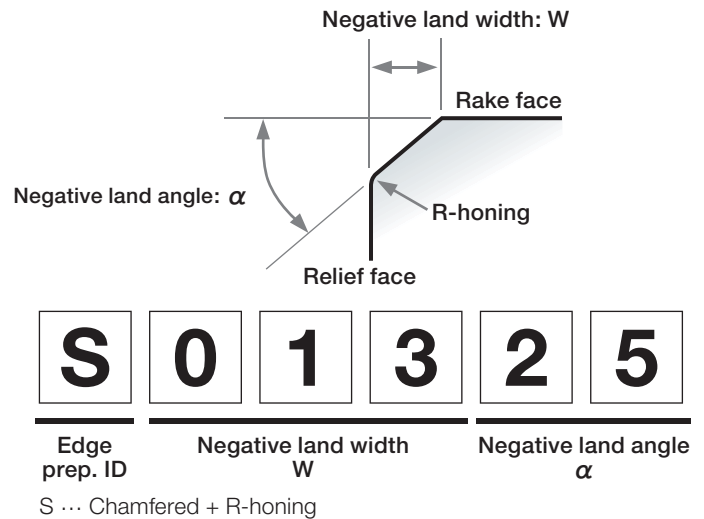
# 5 edge preparation options covering various hard turning applications

## Edge preparations

		Negative land angle $\alpha$ $\rightarrow$ Large		
		15°	25°	35°
Negative land width $W$ (mm)	0.05	LF	-	LC
	0.13	L	Standard	-
	0.18	-	-	H

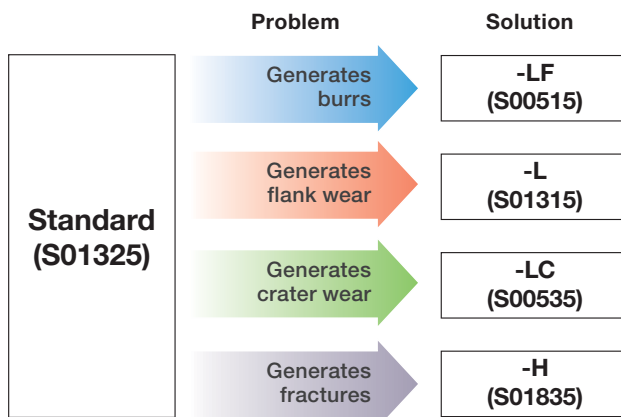
Wide  $\downarrow$

BXA10 inserts



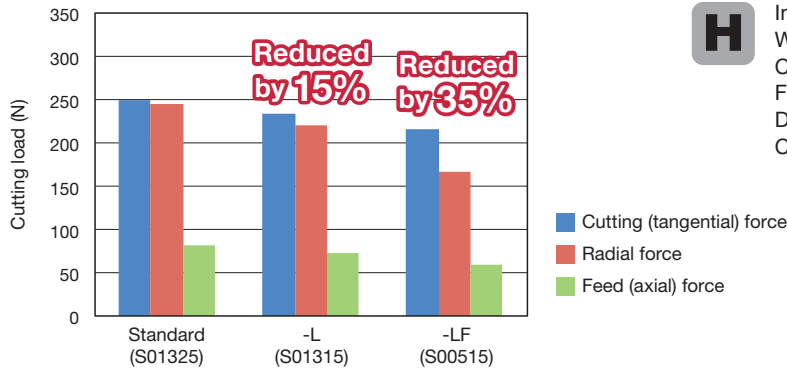
## Selections of edge preparations

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



## Cutting loads

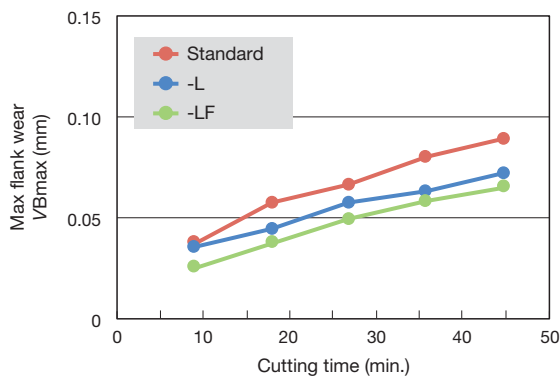
The -L and -LF provide reduced cutting loads over the standard edge prep type



**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 (Alloy steel, 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

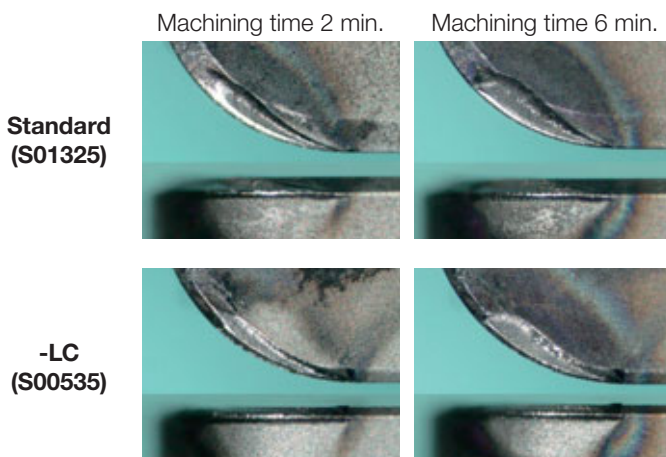
The -L and -LF provide reduced flank wear over the standard edge prep type



**H** Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 (Alloy steel, 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

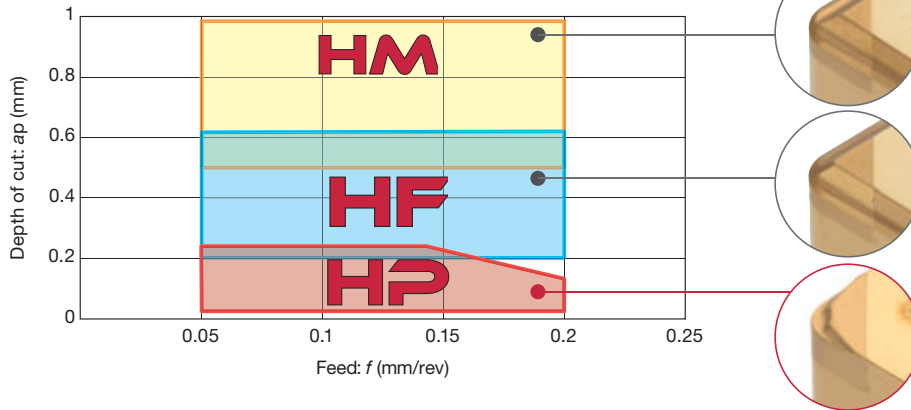
The -LC provides reduced crater wear over the standard edge prep type  
 Reduces insert fracture induced by crater wear



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

## HP chipbreaker

### Application area for negative insert

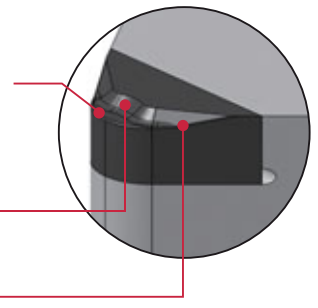


- 1 By separating the chipbreaker from the cutting edge, the cutting force imposed on the cutting edge during machining is significantly reduced, thus providing long tool life.
- 2 The cutting edge preparation is designed to ensure easy cutting at low cutting forces, while maintaining close tolerances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

Optimized edge preparation for low cutting force

HP chipbreaker

Wiper



### Cutting performance

Chip control is stable for a long time

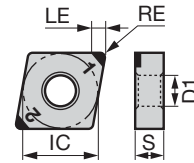
<b>HARDBREAKER HP</b>	<b>VS.</b>	<b>Competitor</b>	
	40 min.		
	80 min.		
			<p>Insert : 2QP-CNGM120408-HP          Workpiece material : SCM420 / 18CrMo4 (58HRC)          Cutting speed : <math>V_c = 180</math> m/min          Feed : <math>f = 0.15</math> mm/rev          Depth of cut : <math>a_p = 0.15</math> mm          Holder : ACLNR2525M12-A          Coolant : Wet          Machining : External continuous cutting</p>



## 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	●	◐	●	◐					



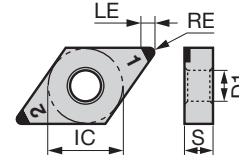
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.							
						No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H	Wiper	Chipbreaker
	<b>2QP-CNGA</b> 2QP-CNGA120402	●	●			2	2.3	0.2	12.7	4.76	5.16	○						
	2QP-CNGA120404	●	●	●	●	2	2.3	0.4	12.7	4.76	5.16	○						
	2QP-CNGA120408	●	●	●	●	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	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-CNGA120402-L	●	●			2	2.3	0.2	12.7	4.76	5.16		○					
	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-CNGA120402-LF	●	●			2	2.3	0.2	12.7	4.76	5.16			○				
	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-CNGA120402-LC	●	●			2	2.3	0.2	12.7	4.76	5.16				○			
	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						○	

● : 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	●	●	●	●	●	●	●



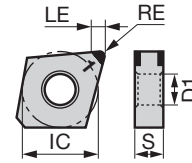
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.							
						No. of corners	LE	RE	IC	S	D1	Standard	L	LF	LC	H	Wiper	Chipbreaker
	<b>2QP-DNGA</b> 2QP-DNGA110404	●	●			2	2.5	0.4	9.525	4.76	3.81	○						
	2QP-DNGA110408	●	●			2	2.1	0.8	9.525	4.76	3.81	○						
	2QP-DNGA110412	●	●			2	2	1.2	9.525	4.76	3.81	○						
	2QP-DNGA150402	●	●			2	2.7	0.2	12.7	4.76	5.16	○						
	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	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	2	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	1.2	12.7	6.35	5.16	○							
<b>2QP-DNGA**-L</b> 	2QP-DNGA150402-L	●	●			2	2.7	0.2	12.7	4.76	5.16		○					
	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	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	1.2	12.7	6.35	5.16		○						
<b>2QP-DNGA**-LF</b> 	2QP-DNGA150402-LF	●	●			2	2.7	0.2	12.7	4.76	5.16			○				
	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	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	1.2	12.7	6.35	5.16			○					
<b>2QP-DNGA**-LC</b> 	2QP-DNGA150402-LC	●	●			2	2.7	0.2	12.7	4.76	5.16				○			
	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	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	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	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	1.2	12.7	6.35	5.16					○		

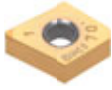
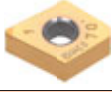



- : New product
- : Line up

## INSERT NEGATIVE TYPE

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- ✱ : 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	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.								
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC	H	Wiper	Chipbreaker
<b>2QP-GNGA</b> (Corner angle 70°) 	<b>2QP-GNGA120402</b>	●	●			2	2.2	0.2	12.7	4.76	5.16	○							
	<b>2QP-GNGA120404</b>	●	●		●	2	2.1	0.4	12.7	4.76	5.16	○							
	<b>2QP-GNGA120408</b>	●	●		●	2	2.1	0.8	12.7	4.76	5.16	○							
	<b>2QP-GNGA120412</b>	●	●		●	2	2.2	1.2	12.7	4.76	5.16	○							
<b>2QP-GNGA**-L</b> (Corner angle 70°) 	<b>2QP-GNGA120402-L</b>	●	●			2	2.2	0.2	12.7	4.76	5.16		○						
	<b>2QP-GNGA120404-L</b>	●	●			2	2.1	0.4	12.7	4.76	5.16		○						
	<b>2QP-GNGA120408-L</b>	●	●			2	2.1	0.8	12.7	4.76	5.16		○						
	<b>2QP-GNGA120412-L</b>	●	●			2	2.2	1.2	12.7	4.76	5.16		○						
<b>2QP-GNGA**-LF</b> (Corner angle 70°) 	<b>2QP-GNGA120402-LF</b>	●	●			2	2.2	0.2	12.7	4.76	5.16				○				
	<b>2QP-GNGA120404-LF</b>	●	●			2	2.1	0.4	12.7	4.76	5.16				○				
	<b>2QP-GNGA120408-LF</b>	●	●			2	2.1	0.8	12.7	4.76	5.16				○				
	<b>2QP-GNGA120412-LF</b>	●	●			2	2.2	1.2	12.7	4.76	5.16				○				
<b>2QP-GNGA**-LC</b> (Corner angle 70°) 	<b>2QP-GNGA120402-LC</b>	●	●			2	2.2	0.2	12.7	4.76	5.16					○			
	<b>2QP-GNGA120404-LC</b>	●	●			2	2.1	0.4	12.7	4.76	5.16					○			
	<b>2QP-GNGA120408-LC</b>	●	●			2	2.1	0.8	12.7	4.76	5.16					○			
	<b>2QP-GNGA120412-LC</b>	●	●			2	2.2	1.2	12.7	4.76	5.16					○			
<b>2QP-GNGA**-H</b> (Corner angle 70°) 	<b>2QP-GNGA120404-H</b>	●	●			2	2.1	0.4	12.7	4.76	5.16						○		
	<b>2QP-GNGA120408-H</b>	●	●			2	2.1	0.8	12.7	4.76	5.16						○		
	<b>2QP-GNGA120412-H</b>	●	●			2	2.2	1.2	12.7	4.76	5.16						○		

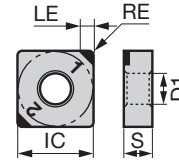
(1) Tungaloy's standard

- : 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	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



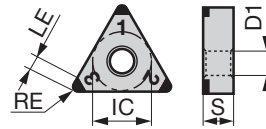
Shape	Designation	Dimension (mm)					Edge prep.					Wiper	Chipbreaker							
		BXA10	BXA20	BXM10	BXM20	No. of corners	LE	RE	IC	S	D1			Standard	Sharp edge	L	LF	LC	H	
	<b>2QP-SNGA</b> 2QP-SNGA120404	●	●	●		2	2.4	0.4	12.7	4.76	5.16	○								
	2QP-SNGA120408	●	●	●		2	2.4	0.8	12.7	4.76	5.16	○								
	2QP-SNGA120412	●	●	●		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			○						

- : New product
- : Line up

## INSERT NEGATIVE 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	●	●c					



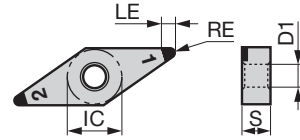
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.								
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC	H	Wiper	Chipbreaker
	<b>3QP-TNGA</b> 3QP-TNGA160402	●	●			3	2.3	0.2	9.525	4.76	3.81	○							
	3QP-TNGA160404	●	●	●	●	3	2.2	0.4	9.525	4.76	3.81	○							
	3QP-TNGA160408	●	●	●	●	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	2	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-TNGA160402-L	●	●			3	2.3	0.2	9.525	4.76	3.81		○						
	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-TNGA160402-LF	●	●			3	2.3	0.2	9.525	4.76	3.81			○					
	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-TNGA160402-LC	●	●			3	2.3	0.2	9.525	4.76	3.81				○				
	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								○

- : New product
- : 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	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



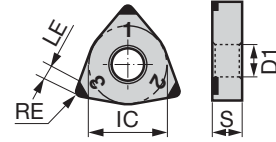
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.					Wiper	Chipbreaker	
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL			LC
	<b>2QP-VNGA</b> 2QP-VNGA160402	●	●			2	3.5	0.2	9.525	4.76	3.81	○						
	2QP-VNGA160404	●	●	●	●	2	3.1	0.4	9.525	4.76	3.81	○						
	2QP-VNGA160408	●	●	●	●	2	2.2	0.8	9.525	4.76	3.81	○						
	2QP-VNGA160412	●	●		●	2	3	1.2	9.525	4.76	3.81	○						
	<b>2QP-VNGA**-L</b> 2QP-VNGA160402-L	●	●			2	3.5	0.2	9.525	4.76	3.81		○					
	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	1.2	9.525	4.76	3.81		○					
	<b>2QP-VNGA**-LF</b> 2QP-VNGA160402-LF	●	●			2	3.5	0.2	9.525	4.76	3.81			○				
	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	1.2	9.525	4.76	3.81			○				
	<b>2QP-VNGA**-LC</b> 2QP-VNGA160402-LC	●	●			2	3.5	0.2	9.525	4.76	3.81				○			
	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	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	1.2	9.525	4.76	3.81						○	

- : New product
- : Line up

## INSERT NEGATIVE 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	●	●c					



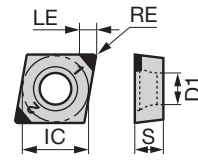
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.							
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker
	<b>3QP-WNGA</b> 3QP-WNGA080404	●	●			3	2.3	0.4	12.7	4.76	5.16	○						
	3QP-WNGA080408	●	●	●	●	3	2.2	0.8	12.7	4.76	5.16	○						
	3QP-WNGA080412	●	●			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							○

- : New product
- c : 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					Dimension (mm)					Edge prep.				Wiper	Chipbreaker		
		BXA10	BXA20	BXM10	BXM20	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L			LF	LC
	<b>2QP-CCGW</b> 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-CCGW09T302	●	●			2	2.3	0.2	9.525	3.97	4.4	○						
	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	○						
	<b>2QP-CCGW**-L</b> 2QP-CCGW060202-L	●	●			2	2.3	0.2	6.35	2.38	2.8		○					
	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-CCGW09T302-L	●	●			2	2.3	0.2	9.525	3.97	4.4		○					
	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		○					
	<b>2QP-CCGW**-LF</b> 2QP-CCGW060202-LF	●	●			2	2.3	0.2	6.35	2.38	2.8			○				
	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-CCGW09T302-LF	●	●			2	2.3	0.2	9.525	3.97	4.4			○				
	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			○				
	<b>2QP-CCGW**-LC</b> 2QP-CCGW060202-LC	●	●			2	2.3	0.2	6.35	2.38	2.8				○			
	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-CCGW09T302-LC	●	●			2	2.3	0.2	9.525	3.97	4.4				○			
	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				○			

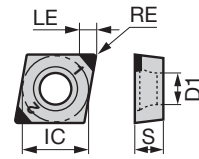
- : New product
- : Line up





## 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



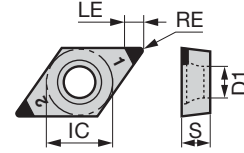
Shape	Designation	Material				No. of corners	Dimension (mm)					Edge prep.							
		BXA10	BXA20	BXM10	BXM20		LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker	
	<b>2QP-CCGW**WL</b> 2QP-CCGW09T304WL	●	●c			2	2.3	0.4	9.525	3.97	4.4								○
	2QP-CCGW09T308WL	●	●c			2	2.2	0.8	9.525	3.97	4.4								○
	<b>2QP-CPGW</b> 2QP-CPGW080202	●	●c			2	2.3	0.2	7.94	2.38	3.4	○							
	2QP-CPGW080204	●	●c			2	2.3	0.4	7.94	2.38	3.4	○							
	2QP-CPGW080208	●	●c			2	2.2	0.8	7.94	2.38	3.4	○							
	2QP-CPGW090302	●	●c			2	2.3	0.2	9.525	3.18	4.4	○							
	2QP-CPGW090304	●	●c			2	2.3	0.4	9.525	3.18	4.4	○							
	2QP-CPGW090308	●	●c			2	2.2	0.8	9.525	3.18	4.4	○							

- : New product
- c : 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	●	◐	◐	◐	◐	◐	◐	◐	◐



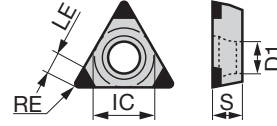
Shape	Designation					Dimension (mm)					Edge prep.								
		BXA10	BXA20	BXM10	BXM20	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker
	<b>2QP-DCGW</b> 2QP-DCGW070202	●	●	●	●	2	2.7	0.2	6.35	2.38	2.8	○							
	2QP-DCGW070204	●	●	●	●	2	2.5	0.4	6.35	2.38	2.8	○							
	2QP-DCGW070208	●	●			2	2.1	0.8	6.35	2.38	2.8	○							
	2QP-DCGW11T301	●	●			2	2.8	0.1	9.525	3.97	4.4	○							
	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-DCGW070202-L	●	●			2	2.7	0.2	6.35	2.38	2.8		○					
	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-DCGW11T302-L	●	●			2	2.7	0.2	9.525	3.97	4.4		○						
	2QP-DCGW11T304-L	●	●			2	2.5	0.4	9.525	3.97	4.4		○						
<b>2QP-DCGW**-LF</b>	2QP-DCGW070202-LF	●	●			2	2.7	0.2	6.35	2.38	2.8			○					
	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-DCGW11T302-LF	●	●			2	2.7	0.2	9.525	3.97	4.4			○					
	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-DCGW070202-LC	●	●			2	2.7	0.2	6.35	2.38	2.8				○			
	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-DCGW11T302-LC	●	●			2	2.7	0.2	9.525	3.97	4.4				○				
	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				○				

- : 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					No. of corners	Dimension (mm)					Edge prep.							
		BXA10	BXA20	BXM10	BXM20		LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker	
	<b>3QP-TPGW</b> 3QP-TPGW080202	●	●			3	2.3	0.2	4.76	2.38	2.3	○							
	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-TPGW090202	●	●			3	2.3	0.2	5.56	2.38	2.5	○							
	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-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	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-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	1.9	0.8	7.94	3.18	3.4	○							
	3QP-TPGW16T302	●	●			3	2.3	0.2	9.525	3.97	4.4	○							
	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-TPGW160402	●	●			3	2.3	0.2	9.525	4.76	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-TPGW110302-L	●	●			3	2.3	0.2	6.35	3.18	3.4		○						
	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-TPGW110302-LF	●	●			3	2.3	0.2	6.35	3.18	3.4			○					
	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-TPGW110302-LC	●	●			3	2.3	0.2	6.35	3.18	3.4				○				
	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-TPGW160402-H	●	●			3	2.3	0.2	9.525	4.76	4.4					○			
	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					○			

● : 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	●	◐	◐	◐	◐				



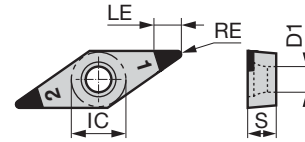
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.									
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LF	LC	H	Wiper	Chipbreaker	
	<b>3QP-TCGW</b> 3QP-TCGW090202	●	●			3	2.3	0.2	5.56	2.38	2.5	○								
	3QP-TCGW090204	●	●			3	2.2	0.4	5.56	2.38	2.5	○								
	3QP-TCGW090208	●	●			3	1.9	0.8	5.56	2.38	2.5	○								
	3QP-TCGW110202	●	●			3	2.3	0.2	6.35	2.38	2.8	○								
	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-TCGW16T302	●	●			3	2.3	0.2	9.525	3.97	4.4	○								
	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
- c : Light interrupted cutting
- \* : Heavy interrupted cutting

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



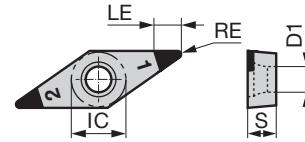
Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.					Wiper	Chipbreaker				
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL			LC	H		
	<b>2QP-VBGW</b> 2QP-VBGW110202	●	●			2	3.5	0.2	6.35	2.38	2.8	○									
	2QP-VBGW110204	●	●			2	3.1	0.4	6.35	2.38	2.8	○									
	2QP-VBGW110208	●	●			2	2.2	0.8	6.35	2.38	2.8	○									
	2QP-VBGW110301	●	●			2	3.7	0.1	6.35	3.18	2.8	○									
	2QP-VBGW110302	●	●			2	3.5	0.2	6.35	3.18	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-VBGW160402	●	●			2	3.5	0.2	9.525	4.76	4.4	○									
	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	1.2	9.525	4.76	4.4	○										
	<b>2QP-VBGW**-L</b> 2QP-VBGW110302-L	●	●			2	3.5	0.2	6.35	3.18	2.8		○								
	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-VBGW160402-L	●	●			2	3.5	0.2	9.525	4.76	4.4		○								
	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		○									
	<b>2QP-VBGW**-LF</b> 2QP-VBGW110302-LF	●	●			2	3.5	0.2	6.35	3.18	2.8			○							
	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-VBGW160402-LF	●	●			2	3.5	0.2	9.525	4.76	4.4			○							
	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			○								
	<b>2QP-VBGW**-LC</b> 2QP-VBGW110302-LC	●	●			2	3.5	0.2	6.35	3.18	2.8				○						
	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-VBGW160402-LC	●	●			2	3.5	0.2	9.525	4.76	4.4				○						
	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				○							

- : New product
- : Line up

## INSERT POSITIVE TYPE

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

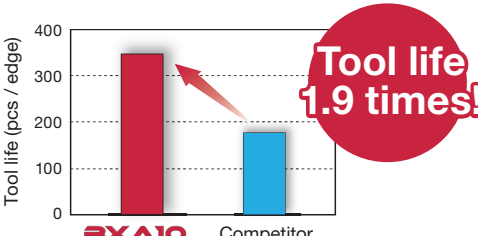
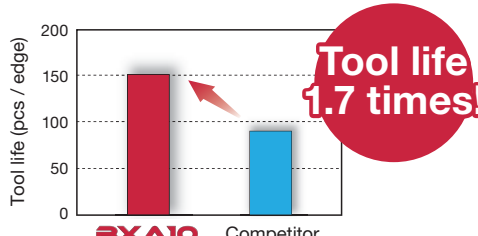
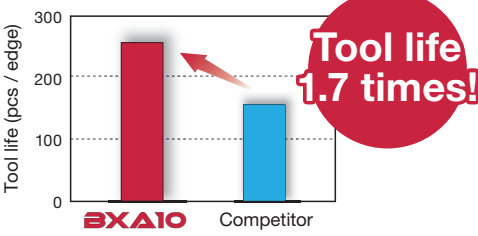
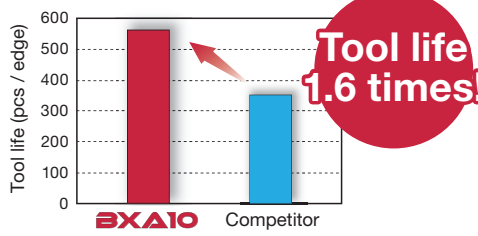
P	Steel																			
M	Stainless																			
K	Cast iron																			
N	Non-ferrous																			
S	Superalloy																			
H	Hard material	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



Shape	Designation	BXA10	BXA20	BXM10	BXM20	Dimension (mm)					Edge prep.									
						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	FL	LC	H	Wiper	Chipbreaker	
	<b>2QP-VCGW080202</b>	●	●			2	3.5	0.2	4.76	2.38	2.3	○								
	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-VCGW160402	●	●			2	3.5	0.2	9.525	4.76	4.4	○								
	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-VCGW160402-H</b>	●	●			2	3.5	0.2	9.525	4.76	4.4								○	
	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
- : Line up

## PRACTICAL EXAMPLES

Workpiece type		Automotive parts (Gear)	Automotive parts (CVT)
Insert		2QP-CNGA120408	2QP-DNGA150408
Grade		BXA10	BXA10
Workpiece material		SCM420 / 18CrMo4 (62HRC)	SCM420 / 18CrMo4 (HV720 - 850)
Cutting conditions			
Cutting speed: $V_c$ (m/min)		100	130
Feed : $f$ (mm/rev)		0.05	0.1
Depth of cut : $a_p$ (mm)		0.15	0.15
Coolant		Dry	Wet
Results		 <p>Flank wear-resistant, BXA10 grade has provided 190% increase in tool life over the competitor's.</p>	 <p>Good coating layer adhesion of BXA10 ensured edge toughness during machining, provided high and stable quality surface finishing.</p>
Workpiece type		Automotive parts (Stator)	Automotive parts (Ring)
Insert		2QP-DCGW11T308	2QP-CCGW09T308-L
Grade		BXA10	BXA10
Workpiece material		SCM420 / 18CrMo4 (62HRC)	16MnCr5 (60HRC)
Cutting conditions			
Cutting speed: $V_c$ (m/min)		168	180
Feed : $f$ (mm/rev)		0.08	0.1 - 0.15
Depth of cut : $a_p$ (mm)		0.2 x 2 passes	0.1
Coolant		Wet	Dry
Results		 <p>Crater wear resistant BXA10 has prevented catastrophic insert failure, providing 170% increase in tool life.</p>	 <p>BXA10 in combination with the -L edge prep has enhanced the insert's cutting edge toughness, prolonging tool life by 160%.</p>

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