NEW PRODUCT NEWS

mgt
MEGA TECH METALWORK

Tungaloy Report No. 551-G

CBN insert

BM05M/BXA10
BXA20/BR35F

CBN series for hardened steel turning

Member IMC Group Tungaloy INDUSTRY 4.0

TUNGALOY ADDFORCE ACCELERATED LINES

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

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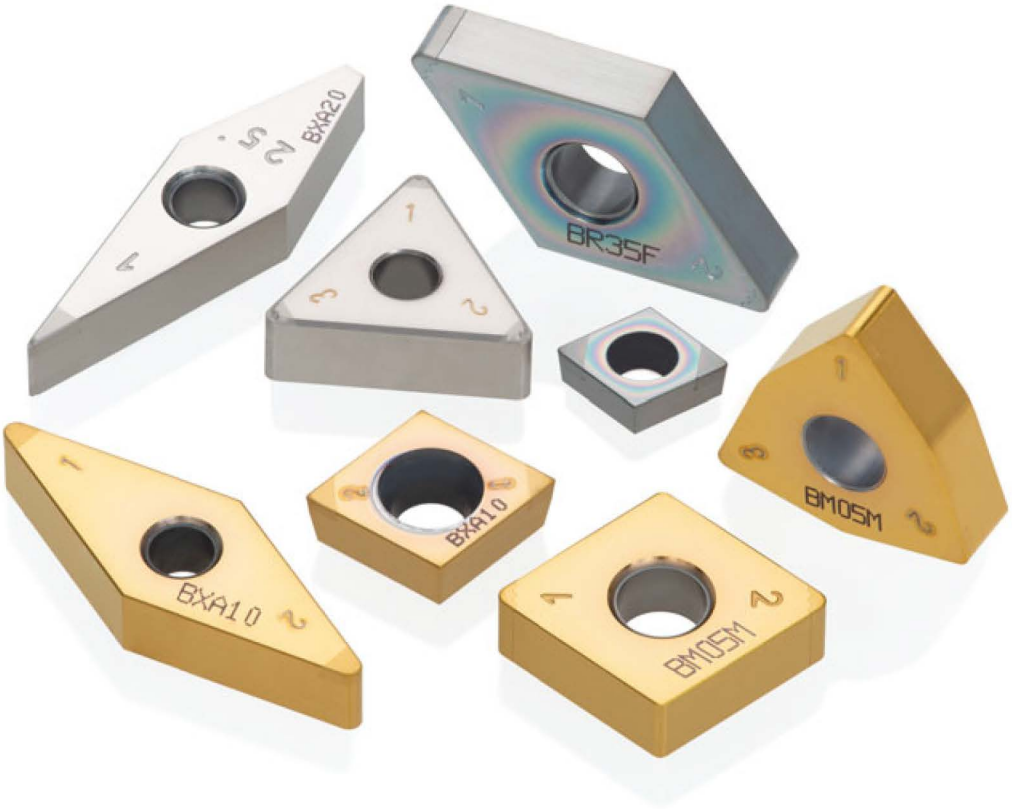
MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F



Introducing **BM05M** coated CBN grade for high speed continuous cuts of hardened steel parts

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TUNGALOY ADDFORCE ACCELERATED LINES

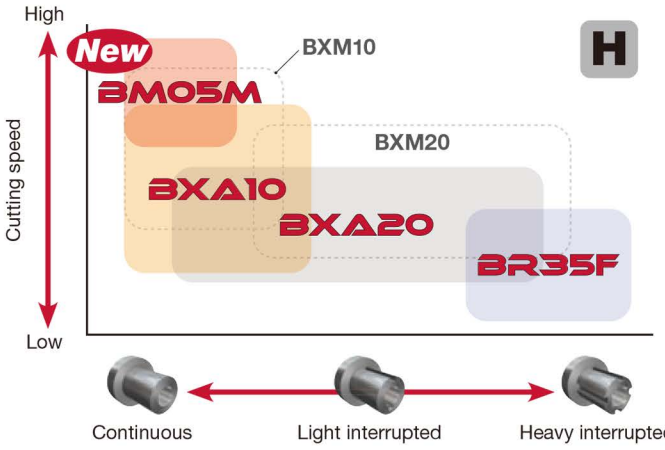
mgt MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

Coated CBN series for a wide range of hard part turning

■ Application areas

The most suitable grade can be selected for your application requirements



New **BM05M**

First choice for high speed continuous cuts.
For *Vc* = 350 m/min or less.

BXA10

First choice for continuous to light interrupted cuts.
For *Vc* = 230 m/min or less.

BXA20

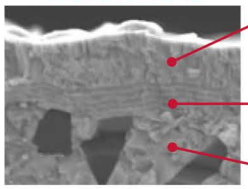
Versatile grade from continuous to heavy interrupted cuts.
For *Vc* = 180 m/min or less.

BR35F

First choice for heavy interrupted cuts.
For *Vc* = 150 m/min or less.

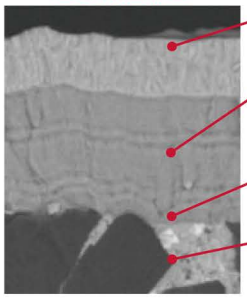
■ Grade properties

New **BM05M**



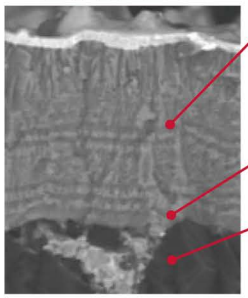
- TiCN coating with high thermal strength and excellent wear resistance
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent flank wear and crater wear resistance

BXA10



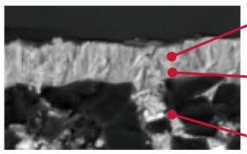
- TiCN coating with high thermal stability and wear resistance
- Multilayer TiAlN coating with good adhesion and resistance to delamination and chipping
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent crater wear and chipping resistance

BXA20



- Thick multilayer TiAlN coating with superior wear and chipping resistance
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent crater wear and fracture resistance

BR35F



- Multilayer AlCrN coating with excellent fracture resistance
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent chipping and fracture resistance

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

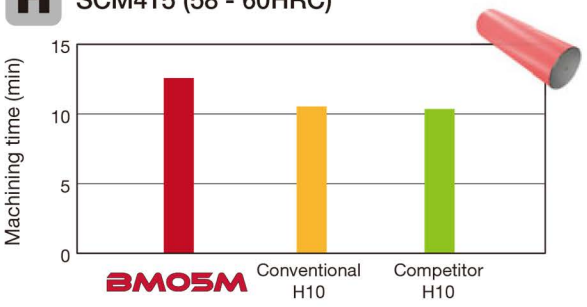
MEGA TECH METALWORK

CUTTING PERFORMANCE

New

BM05M

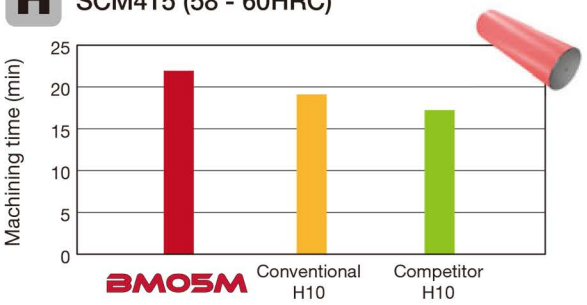
H SCM415 (58 - 60HRC)



Insert : DNGA150408
Cutting speed : *Vc* = 300 m/min
Feed : *f* = 0.08 mm/rev
Depth of cut : *ap* = 0.1 mm
Machining : Continuous cutting
Coolant : Wet

BM05M provided superior wear resistance during super high speed continuous cuts of hardened steel.

H SCM415 (58 - 60HRC)

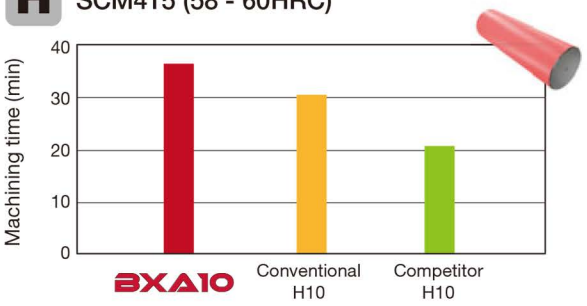


Insert : DNGA150408
Cutting speed : *Vc* = 250 m/min
Feed : *f* = 0.08 mm/rev
Depth of cut : *ap* = 0.1 mm
Machining : Continuous cutting
Coolant : Wet

BM05M provided the insert with good wear resistance during high speed continuous cuts of hardened steel parts.

BXA10

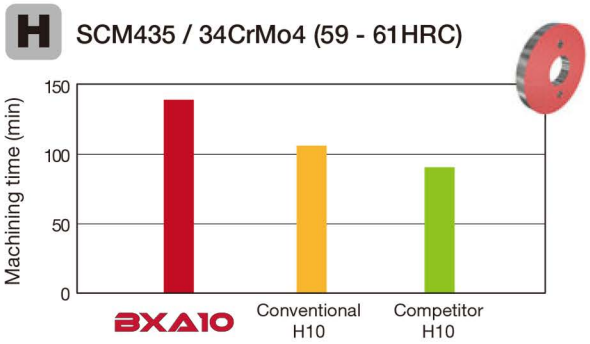
H SCM415 (58 - 60HRC)



Insert : CNGA120408
Cutting speed : *Vc* = 200 m/min
Feed : *f* = 0.15 mm/rev
Depth of cut : *ap* = 0.15 mm
Machining : Continuous cutting
Coolant : Wet

BXA10 provided the insert with good wear resistance during continuous cuts of hardened steel parts.

H SCM435 / 34CrMo4 (59 - 61HRC)



Insert : CNGA120408
Cutting speed : *Vc* = 130 m/min
Feed : *f* = 0.15 mm/rev
Depth of cut : *ap* = 0.15 mm
Machining : Light interrupted cutting
Coolant : Wet

BXA10 provided the insert with good chipping resistance during light interrupted cuts of hardened steel parts.

NEW PRODUCT NEWS

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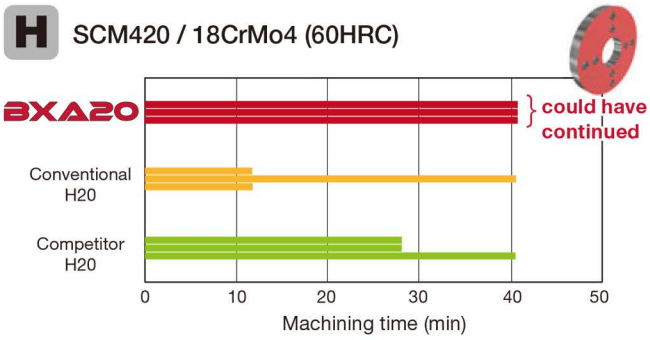
MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

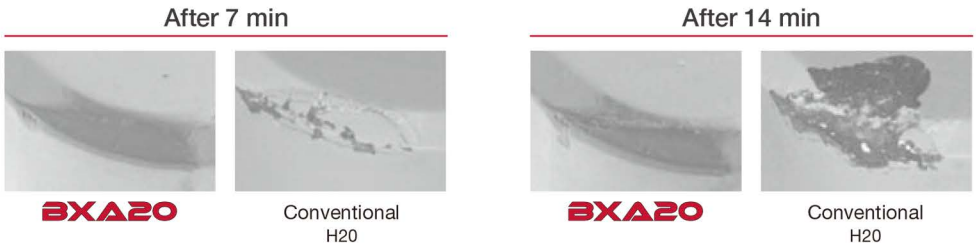
BXA20

H SCM420 / 18CrMo4 (60HRC)



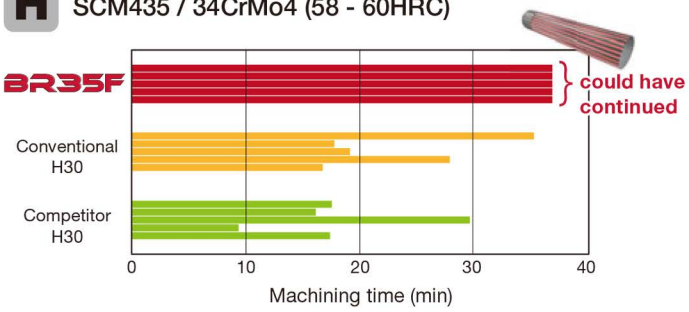
Insert : CNGA120408
Cutting speed : *Vc* = 100 m/min
Feed : *f* = 0.1 mm/rev
Depth of cut : *ap* = 0.2 mm
Machining : Light interrupted cutting
Coolant : Wet

BXA20 provided the insert with good fracture resistance, while preventing delamination, during light interrupted cuts of hardened steel parts.



BR35F

H SCM435 / 34CrMo4 (58 - 60HRC)



Insert : CNGA120408
Cutting speed : *Vc* = 100 m/min
Feed : *f* = 0.15 mm/rev
Depth of cut : *ap* = 0.15 mm
Machining : Heavy interrupted cutting
Coolant : Dry

BR35F provided the insert with good fracture resistance during heavy interrupted cuts of hardened steel parts.

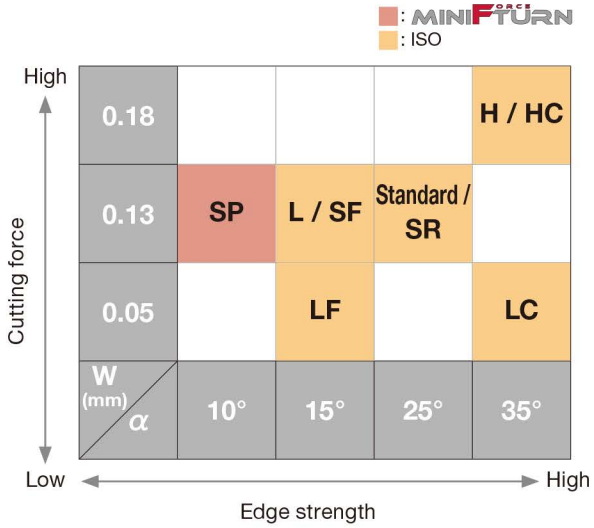
STANDARD CUTTING CONDITIONS

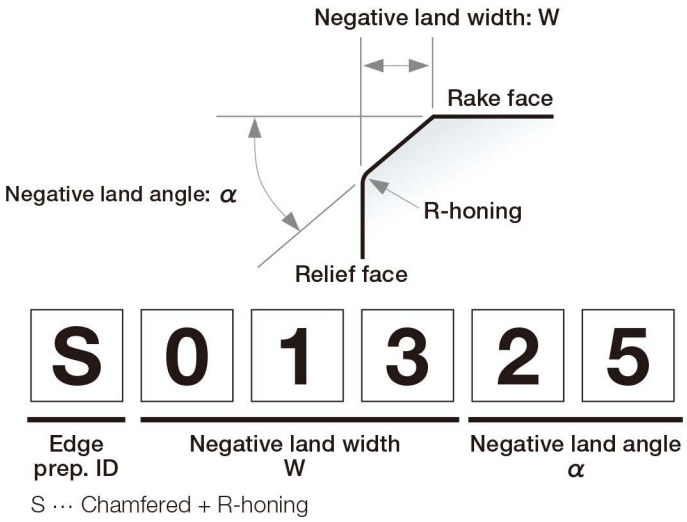
ISO	Grade	Workpiece condition	Cutting speed *Vc* (m/min)	Depth of cut *ap* (mm)	Feed *f* (mm/rev)
H	BM05M	Continuous	200 - 350	0.05 - 0.2	0.05 - 0.2
	BXA10	Continuous	100 - 230	0.05 - 0.5	0.05 - 0.3
		Light interrupted	100 - 230	0.05 - 0.3	0.05 - 0.2
	BXA20	Continuous	60 - 180	0.05 - 0.5	0.05 - 0.3
		Interrupted	60 - 180	0.05 - 0.3	0.05 - 0.2
	BR35F	Heavy interrupted	50 - 150	0.05 - 0.3	0.05 - 0.2

■ Edge preparations

Various styles of edge preparations are available according to the application needs

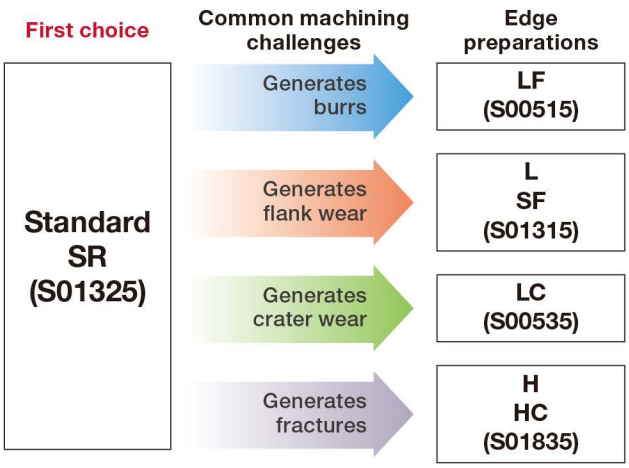
General-purpose **BXA10** and **BXA20** grade ISO inserts are offered in five edge preparations each as standard. In addition, **BM05M** grade ISO inserts are available in four edge preps for high speed continuous cuts and **BR35F** grade ISO inserts in two for heavy interrupted cuts.
MiniForce-Turn inserts are available in the SP style edge prep (S01310).





■ Selections of edge preparations

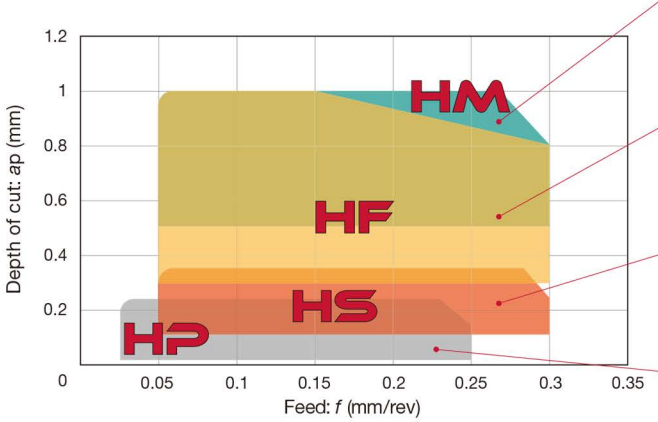
Optimized edge preparations for machining challenges



BM05M/BXA10/BXA20/BR35F

HARDBREAKER SERIES

CBN inserts with chipbreaker ideal for carburized layer removal and finishing hardened steel



For removal of carburized layer
Breaker shape with excellent chipping resistance in deep cuts

For removal of carburized layer
- Reliable chip restraint over a wide cutting area
- Breaker shape for low cutting resistance and crater wear

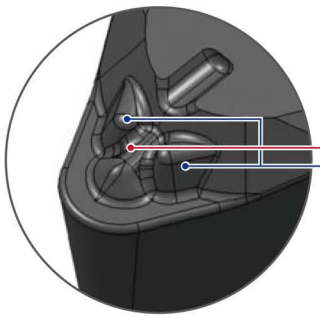
For high feed finishing
- Breaker shape for excellent chip control
- Edge prep to prevent catastrophic failure

For precision finishing
Breaker shape suitable for precision finishing

New

New HP chipbreaker designed for 0.2 mm corner radius

Featuring two distinctive chip redirectors, the chipbreaker geometry is designed for a small corner radius to provide effective chip control.



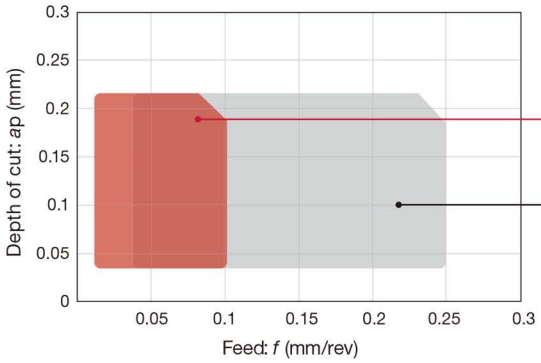
Chip Redirector 1

Positioned close to the cutting edge, Chip Redirector 1 ensures smooth chip control during finish machining.

Chip Redirector 2

Directs chips that pass over Chip Redirector 1 away from the cutting area, especially in cases such as:
Machining at increased feeds and speeds
Wear occurring on Chip Redirector 1

■ Recommended cutting parameters



Corner radius 0.2 mm

Corner radius 0.4, 0.8, and 1.2 mm

NEW PRODUCT NEWS

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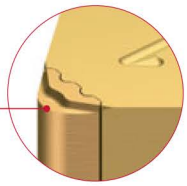
MEGA TECH METALWORK

HP chipbreaker

Designed for finish machining of hardened parts with close tolerances

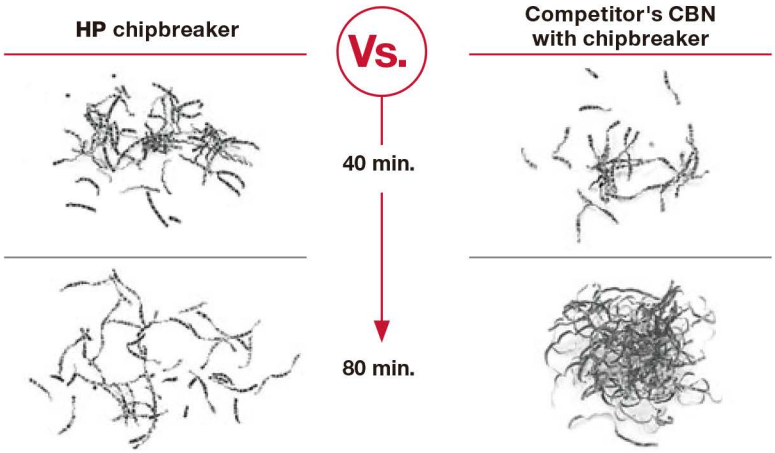
- Optimized chipbreaker geometry significantly reduces cutting force imposed on the cutting edge, ensuring long tool life.
- The edge preparation is designed to generate low cutting force, providing chatter-free machining and close tolerances.
- The built-in wiper yields excellent surface quality and good chip control.

Optimized edge preparation for low cutting force



CUTTING PERFORMANCE

HP chipbreaker provides better chip control over the competitors

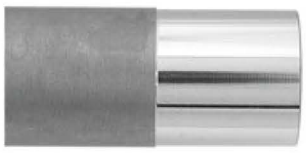


Insert	: 2QP-CNGM120408-HP
Workpiece material	: SCM420 / 18CrMo4 (58HRC)
Cutting speed	: *Vc* = 180 m/min
Feed	: *f* = 0.15 mm/rev
Depth of cut	: *ap* = 0.15 mm
Holder	: ACLNR2525M12-A
Coolant	: Wet
Machining	: External continuous cutting

Chatter stability

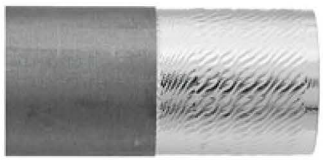
→ Prevents chattering and provides the finest machined surface

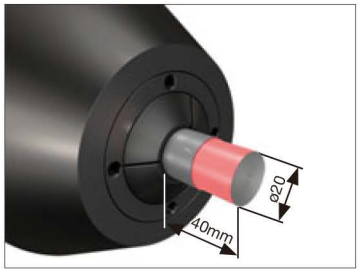
HP chipbreaker



Due to low cutting force, chatter stability is greatly improved.

Competitor (without breaker)





Insert	: 2QP-CNGM120408-HP
Workpiece material	: SCM420 / 18CrMo4 (58HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.15 mm/rev
Depth of cut	: *ap* = 0.15 mm
Machining	: External continuous cutting

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TUNGALOY ADDFORCE ACCELERATED LINES

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

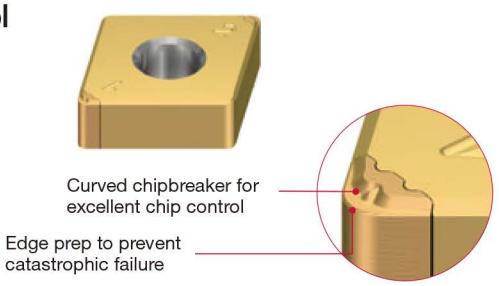
BM05M/BXA10/BXA20/BR35F

HARDBREAKER SERIES

HS chipbreaker

Optimized chipbreaker design for excellent chip control during hard turning at aggressive conditions

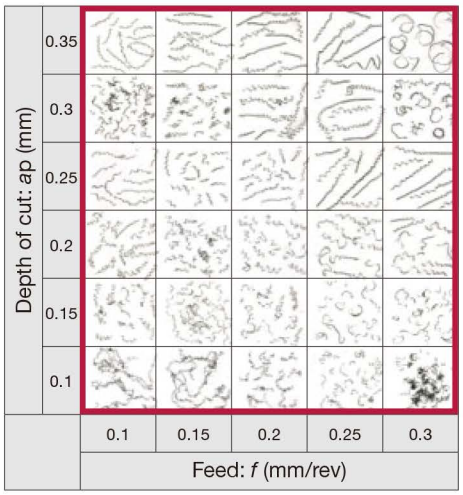
- Designed for high feed machining.
- Provides excellent chip control for a wide range of D.O.C. and feed rates.
- Edge preparation is designed to prevent catastrophic failure.



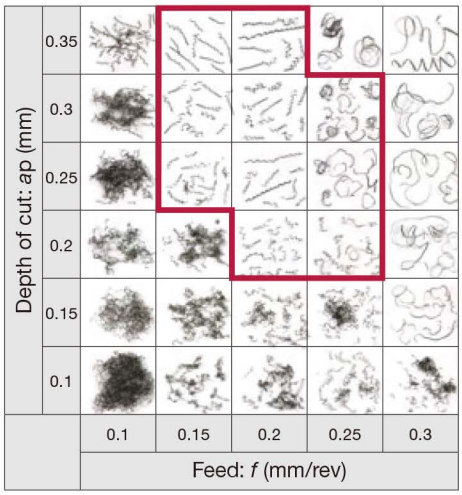
CUTTING PERFORMANCE

HS provides all-round chip breaking capability even at increased feed rates vs. competitors

HS chipbreaker



Competitor's CBN with chipbreaker



Insert	: 2QP-CNGM120408-HS
Workpiece material	: SCM420 (58HRC)
Cutting speed	: *Vc* = 150 m/min
Holder	: ACLNL2525M12-A
Coolant	: Wet
Machining	: External continuous cutting

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TUNGALOY ADDFORCE ACCELERATED LINES

HF/HM chipbreakers

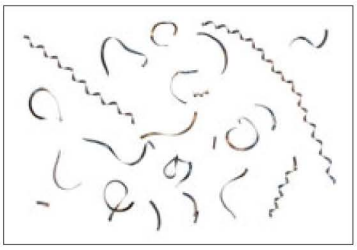
- Suited for hard turning applications requiring great D.O.C. such as carburized layer removal.
- Effective chip breaking is possible for a wide range of hard materials.
- **BXA20** and **BXM20** CBN grade inserts are available for aggressive cutting depths.

CUTTING PERFORMANCE (EXAMPLES OF ACTUAL PROCESSING)

■ Chip control

Comparisons of chip formations after machining 80 pcs of automotive shafts

HF chipbreaker

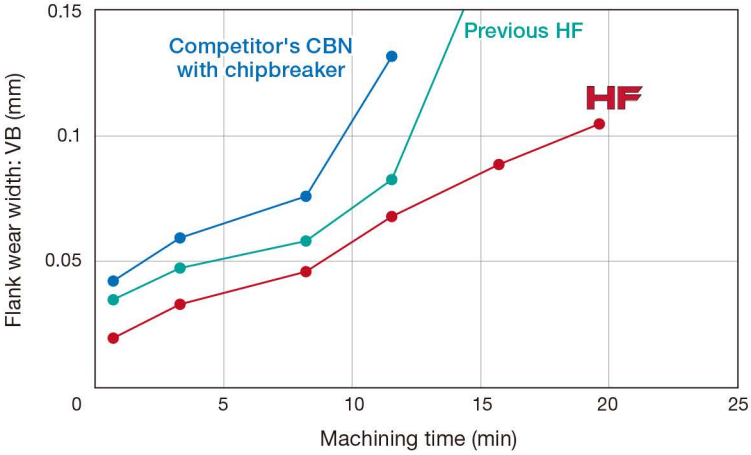


Competitor's CBN with chipbreaker

Insert	: 2QP-CNGM120408-HF
Workpiece material	: SCM415 (60HRC)
Cutting speed	: *Vc* = 180 m/min
Feed	: *f* = 0.2 mm/rev
Depth of cut	: *ap* = 0.5 mm x 3 passes
Holder	: ACLNL25252M12-A
Machining	: External continuous cutting
Coolant	: Wet

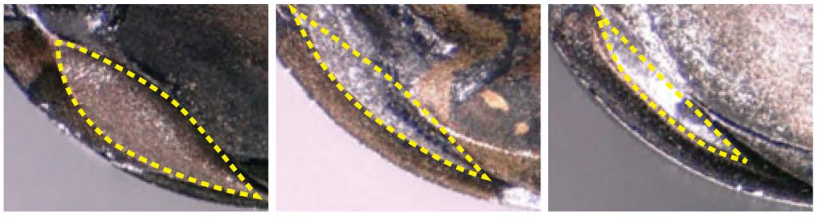
■ Crater wear resistance

Comparison of automotive clutch machining lifetime



Insert	: 2QP-CNGM120408-HF
Workpiece material	: SCM415 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.15 mm/rev
Depth of cut	: *ap* = 0.5 mm x 5 passes
Holder	: ACLNL25252M12-A
Machining	: External continuous cutting
Coolant	: Wet

Comparisons of crater wear sizes (After 8 min)

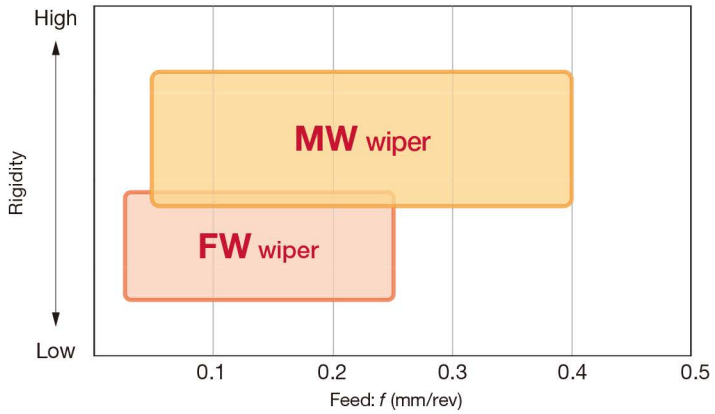


Competitor's chipbreaker | Previous HF chipbreaker | New **HF** chipbreaker

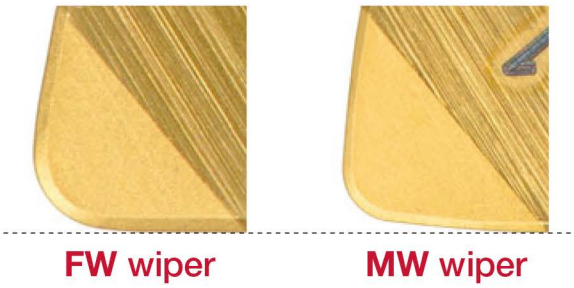
BM05M/BXA10/BXA20/BR35F

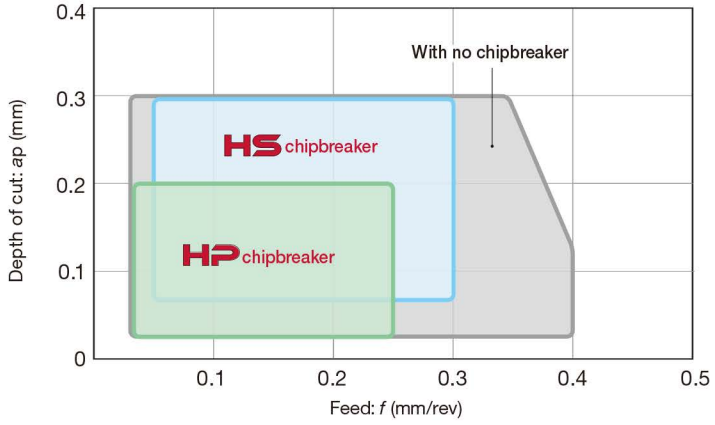
Inserts with built-in wiper

■ Application areas



FW wiper eliminates chatter generation at slower feeds and offers good surface part quality.
MW wiper provides improved surface finishing at an increased feed rate.

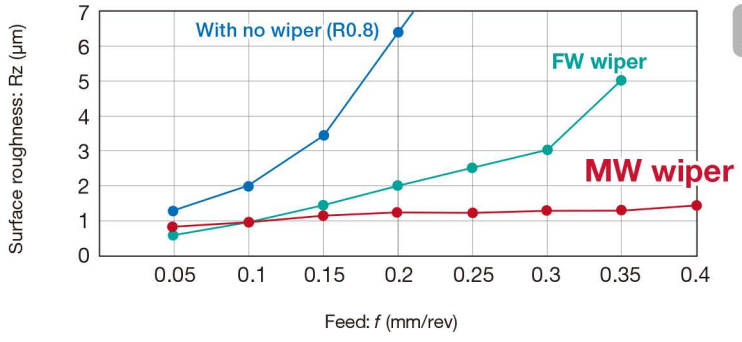




Available with **HP chipbreaker** and **HS chipbreaker** for effective chip control. Inserts with no chipbreaker are also available.

CUTTING PERFORMANCE

Surface roughness



H

Insert	: 4QS-CNGA120408*W BXA10
Toolholder	: ACLNL2525M12-A
Workpiece material	: SCM415 (58 - 60 HRC)
Cutting speed	: *Vc* = 150 m/min
Depth of cut	: *ap* = 0.15 mm
Machining	: External continuous cutting
Coolant	: Wet

mgt MEGA TECH METALWORK

WavyJoint

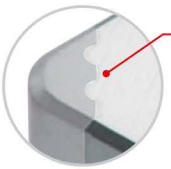
New brazing technology for increased machining efficiency

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

Double-sided inserts

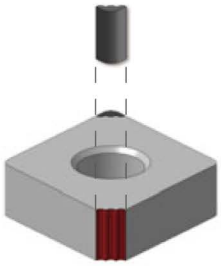
Innovative WavyJoint brazing technology

Prevents the CBN tips from debrazing, eliminating abrupt insert fractures during demanding dry machining, while securing stable and predictable hard turning operations.



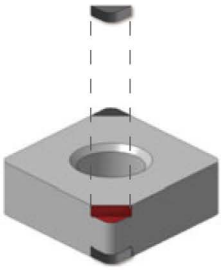
The "wavy" contact surface enhances the brazing strength

WavyJoint Vs. **Standard**



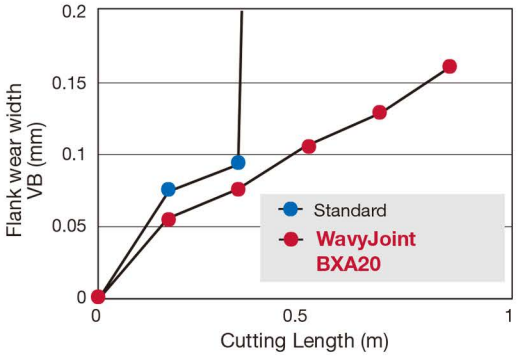
CBN Tip Size: 200% larger for improved wear resistance of the cutting edge

Brazing Area: 160% larger for enhanced brazing strength



CUTTING PERFORMANCE

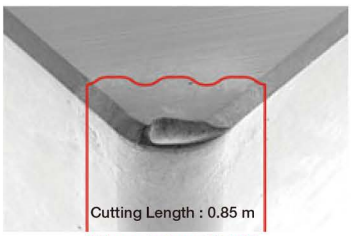
Effect of increased brazing area



H

Insert	: Standard = 2QP-CNGM12408-HM BXA20
	WavyJoint = 4QS-CNGG120408-HM BXA20
Workpiece material	: SCM420 / 18CrMo4 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.2 mm/rev
Depth of cut	: *ap* = 0.75 mm
Toolholder	: ACLNL2525M12-A
Machining	: External turning
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.

MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

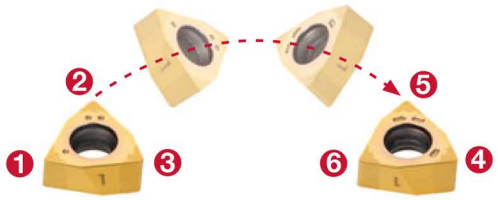
MINIFORCE TURN

Double-sided positive insert with CBN tips

MiniForce-Turn now offers WavyJoint CBN inserts that provide additional strength and security in aggressive cutting conditions.

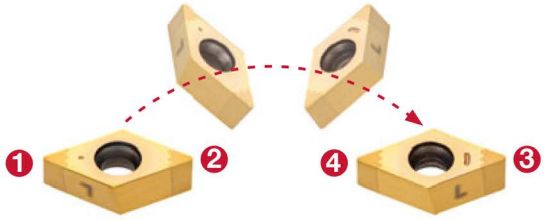
WXGQ/U insert

- 6 edges, Trigon 80°
- HP chipbreaker, without breaker

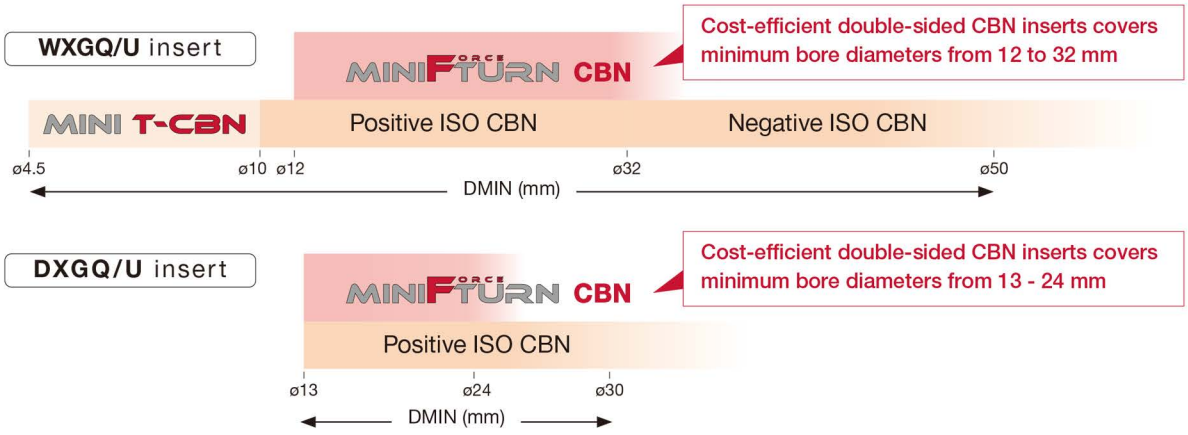


DXGQ/U insert

- 4 edges, rhombic 55°
- HP chipbreaker, without breaker

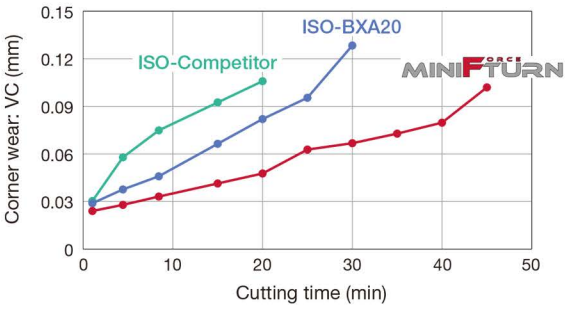


APPLICATIONS: INTERNAL TURNING AND PROFILING OF HARDENED STEEL PARTS



CUTTING PERFORMANCE

For ID turning of continuous cut (4xD)



H

Insert	: 6QS-WXGQ040304SPL BXA20 (**MiniForce-Turn**) 2QP-CCGW060204 BXA20 (ISO) CCGW060204 type Competitor's H20 grade (ISO)
Toolholder	: E10M-SWLXR04-D120 (**MiniForce-Turn**) E10M-SCLCR06-D120 (ISO)
Workpiece material	: SCM420 / 18CrMo4 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.1 mm/rev
Depth of cut	: *ap* = 0.15 mm
Coolant	: Wet

Thanks to unique geometry design, **MiniForce-Turn** insert provides double tool life over competitor's ISO positive insert.

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

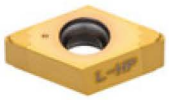
MEGA TECH METALWORK

HARDBREAKER HP

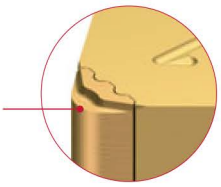
Designed for finish machining of hardened parts with close tolerances

- HP chipbreaker provides excellent surface quality and good chip control.
- Optimized chipbreaker geometry significantly reduces cutting force imposed on the cutting edge, ensuring long tool life.
- The edge preparation is designed to generate low cutting force, providing chatter-free machining and close tolerances.

6QS-WXGU0403**R/L-HP



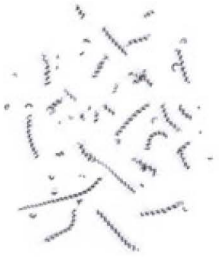
4QS-DXGU0703**R/L-HP



CHIP CONTROL

HP chipbreaker provides excellent chip control in finish machining of hardened steel parts while eliminating chip packing during continuous cuts of I.D. turning operations.

HARDBREAKER HP



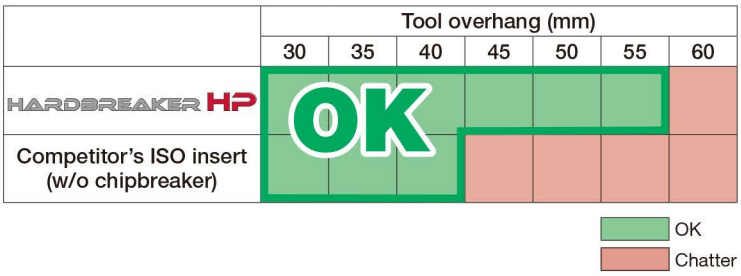
Competitor's ISO insert (w/o chipbreaker)

H

Insert	: 6QS-WXGU040304L-HP BXA10
Toolholder	: A16Q-SWLXR04-D180
Workpiece material	: SCM420 / 42CrMo4 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.1 mm/rev
Depth of cut	: *ap* = 0.1 mm
Coolant	: Wet
Application	: Continuous cut, I.D. turning

CUTTING FORCES

HP chipbreaker features soft cutting geometry for reduced cutting forces while eliminating chatter during continuous cuts of I.D. turning operations that use long overhang tool setup.



H

Insert	: 6QS-WXGU040304L-HP BXA10
Toolholder	: A16Q-SWLXR04-D180
Workpiece material	: SCM420 / 42CrMo4 (60HRC)
Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.1 mm/rev
Depth of cut	: *ap* = 0.1 mm
Coolant	: Wet
Application	: Continuous cut, I.D. turning

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

GNGA/FNGA/YNGA

New CBN inserts for general turning

GNGA insert with 70° corner angle
FNGA insert with 45° corner angle

- Smaller corner angle provides the insert with greater clearance between the insert flank and workpiece surface, allowing better chip flow and evacuation

- Enables greater D.O.C. in face turning applications in which the insert is pulled outward (fed away from the workpiece center)

GNGA

FNGA

YNGA insert with 25° corner angle

Allows undercutting, V grooving, and other applications that are not possible with traditional V inserts

YNGA

High versatility

- Existing ISO turning toolholder can be used for these inserts
  For GNGA insert: use the holder for CN**1204 insert
  For FNGA insert: use the holder for DN**1504 insert
  For YNGA insert: use the holder for VN**1604 insert

- No offsets needed compared to ISO inserts, due to same geometry of cutting edge position

- Double-sided insert with 2 cutting edges

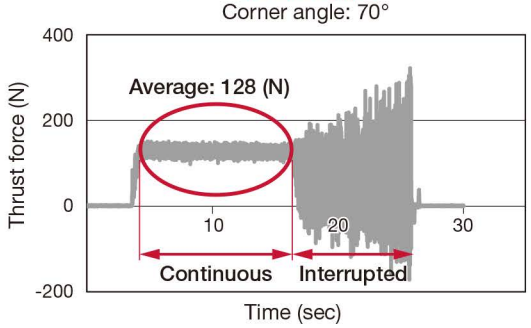
Member IMC Group Tungaloy INDUSTRY 4.0

TUNGALOY ADDFORCE ACCELERATED LINES

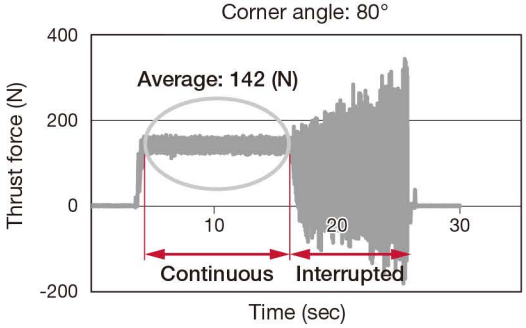
CUTTING PERFORMANCE

■ Cutting force (Thrust force)

GNGA type
Corner angle: 70°



CNGA type
Corner angle: 80°



Cutting force of **GNGA** insert is lower than regular CNGA insert's.

H

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

■ Chip flow and control in face turning

Chip flow of continuous face turning

GNGA type
Corner angle: 70°

CNGA type
Corner angle: 80°

Chip control in interrupted face turning

GNGA type
Corner angle: 70°

CNGA type
Corner angle: 80°

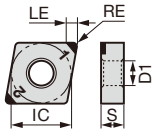
Since **GNGA** type inserts have enough space for chip flow, chip packing doesn't occur, improving surface finish and preventing sudden chipping on cutting edge.

H

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

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

CN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

80°Rhombic with hole

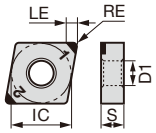
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron	●	●	●ⓒ	✣	●	●ⓒ
S	Superalloy						
H	Hard material						
	Sintered alloy						

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-CNGA120402-LF	0.2	2.3	2			○					●	●			
	2QP-CNGA12040**2-L**		2.3	2				○				●	●			
	2QP-CNGA12040**4LF**	0.4	2.3	2			○				●					
	2QP-CNGA12040**4-LF**		2.3	2			○					●	●			
	4QS-CNGA120404**LF**		1.6	4			○				●					
	4QS-CNGA12040**4-LF**		1.6	4			○					●	●			
	2QP-CNGA120404**-L**		2.3	2				○				●	●		●	●
	2QP-CNGA12040**4SF**		2.3	2				○			●					
	4QS-CNGA120404**SF**		1.6	4				○			●					
	2QP-CNGA120404**FW**		2.3	2	○	○					●	●	●		●	●
	4QS-CNGA120404**FW**		1.6	4	○	○					●	●	●			
	2QP-CNGA120404**MW**		3.2	2	○	○					●	●	●			
	4QS-CNGA120404**MW**		2.9	4	○	○					●	●	●			
	2QP-CNGA120408**LF**	0.8	2.2	2			○				●					
	2QP-CNGA12040**8-LF**		2.2	2			○					●	●			
	4QS-CNGA120408**LF**		1.5	4			○				●					
	4QS-CNGA12040**8-LF**		1.5	4			○					●	●			
	2QP-CNGA120408**-L**		2.2	2				○				●	●		●	●
	2QP-CNGA12040**8SF**		2.2	2				○			●					
	4QS-CNGA120408**SF**		1.5	4				○			●					
	2QP-CNGA120408**FW**		2.2	2	○	○					●	●	●		●	●
	4QS-CNGA120408**FW**		1.8	4	○	○					●	●	●			
	2QP-CNGA120408**MW**		3.1	2	○	○					●	●	●			
	4QS-CNGA120408**MW**		2.8	4	○	○					●	●	●			
	2QP-CNGA120412**LF**	1.2	2.4	2			○				●					
	2QP-CNGA12041**2-LF**		2.4	2			○					●	●			
	4QS-CNGA120412**LF**		1.7	4			○				●					
	4QS-CNGA12041**2-LF**		1.7	4			○					●	●			
	2QP-CNGA120412**-L**		2.4	2				○				●	●		●	●
	2QP-CNGA12041**2SF**		2.4	2				○			●					
	4QS-CNGA120412**SF**		1.7	4				○			●					
	2QP-CNGA120412**FW**		2.4	2	○	○					●	●	●		●	●
	4QS-CNGA120412**FW**		2.1	4	○	○					●	●	●			
	2QP-CNGA120412**MW**		3.4	2	○	○					●	●	●			
	4QS-CNGA120412**MW**		3.9	4	○	○					●	●	●			
Finishing	2QP-CNGA120402	0.2	2.3	2		○						●	●			
	2QP-CNGA12040**2-LC**		2.3	2					○			●	●			
	2QP-CNGA12040**4**	0.4	2.3	2		○						●	●		●	●
	2QP-CNGA12040**4SR**		2.3	2		○					●			●		
	4QS-CNGA120404		1.6	4		○						●	●			
	4QS-CNGA12040**4SR**		1.6	4		○					●			●		
	2QP-CNGA120404**LC**		2.3	2					○		●					
	2QP-CNGA12040**4-LC**		2.3	2					○			●	●			
	4QS-CNGA120404**LC**		1.6	4					○		●					
	4QS-CNGA12040**4-LC**		1.6	4					○			●	●			

● : New product
● : Line up

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

CN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

80°Rhombic with hole

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ⓒ	✣	●	●ⓒ
	Sintered alloy						

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Finishing	2QP-CNGA120408	0.8	2.2	2		○						●	●		●	●
	2QP-CNGA12040**8SR**		2.2	2		○					●			●		
	4QS-CNGA120408		1.5	4		○						●	●			
	4QS-CNGA12040**8SR**		1.5	4		○					●			●		
	2QP-CNGA120408LC		2.2	2					○		●					
	2QP-CNGA12040**8-LC**		2.2	2					○			●	●			
	4QS-CNGA120408LC		1.5	4					○		●					
	4QS-CNGA12040**8-LC**		1.5	4					○			●	●			
	2QP-CNGA120412	1.2	2.4	2		○						●	●		●	●
	2QP-CNGA12041**2SR**		2.4	2		○					●			●		
	4QS-CNGA120412		1.7	4		○						●	●			
	4QS-CNGA12041**2SR**		1.7	4		○					●			●		
	2QP-CNGA120412LC		2.4	2					○		●					
	2QP-CNGA12041**2-LC**		2.4	2					○			●	●			
	4QS-CNGA120412LC		1.7	4					○		●					
	4QS-CNGA12041**2-LC**		1.7	4					○			●	●			
	2QP-CNGA120416	1.6	3.3	2		○						●	●			
	2QP-CNGA12041**6SR**		3.3	2		○								●		
	2QP-CNGA12042**0**	2	3.2	2		○						●	●			
	2QP-CNGA12042**0SR**		3.2	2		○								●		
	2QP-CNGA12042**4**	2.4	3.1	2		○						●	●			
	2QP-CNGA12042**4SR**		3.1	2		○								●		
Medium cutting	2QP-CNGA120404-H	0.4	2.3	2						○		●	●			●
	2QP-CNGA12040**4HC**		2.3	2						○				●		
	4QS-CNGA120404-H		1.6	4						○		●	●			
	4QS-CNGA12040**4HC**		1.6	4						○				●		
	2QP-CNGA120408-H	0.8	2.2	2						○		●	●			●
	2QP-CNGA12040**8HC**		2.2	2						○				●		
	4QS-CNGA120408-H		1.5	4						○		●	●			
	4QS-CNGA12040**8HC**		1.5	4						○				●		
	2QP-CNGA120412-H	1.2	2.4	2						○		●	●			●
	2QP-CNGA12041**2HC**		2.4	2						○				●		
	4QS-CNGA120412-H		1.7	4						○		●	●			
	4QS-CNGA12041**2HC**		1.7	4						○				●		
	2QP-CNGA120416HC	1.6	3.3	2						○				●		
	2QP-CNGA12042**0HC**	2	3.2	2						○				●		
	2QP-CNGA12042**4HC**	2.4	3.1	2						○				●		

● : New product
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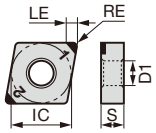
CN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
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80°Rhombic with hole

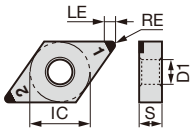
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ⓒ	✣	●	●ⓒ
	Sintered alloy						

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	4QS-CNGG120402-HP	0.2	1.6	4		○							●			
	2QP-CNGM120404-HP	0.4	2.3	2		○					●	●	●	●	●	
	4QS-CNGG120404-HP		1.6	4		○					●	●	●	●		
	2QP-CNGM120404FW-HP		2.3	2	○	○					●					
	4QS-CNGG120404FW-HP		1.6	4	○	○					●					
	2QP-CNGM120404MW-HP		3.2	2	○	○					●	●	●			
	4QS-CNGG120404MW-HP		2.9	4	○	○					●	●	●			
	2QP-CNGM120404-HS		2.3	2		○						●	●	●		
	4QS-CNGG120404-HS		1.6	4		○						●	●	●		
	2QP-CNGM120404MW-HS		3.2	2	○	○						●	●			
	4QS-CNGG120404MW-HS		2.9	4	○	○						●	●			
	2QP-CNGM120408-HP	0.8	2.2	2		○					●	●	●	●	●	
	4QS-CNGG120408-HP		1.5	4		○					●	●	●	●		
	2QP-CNGM120408FW-HP		2.2	2	○	○					●	●	●		●	
	4QS-CNGG120408FW-HP		1.8	4	○	○					●	●	●			
	2QP-CNGM120408MW-HP		3.1	2	○	○					●	●	●			
	4QS-CNGG120408MW-HP		2.8	4	○	○					●	●	●			
	2QP-CNGM120408-HS		2.2	2		○						●	●	●		
	4QS-CNGG120408-HS		1.8	4		○						●	●	●		
	2QP-CNGM120408FW-HS		2.2	2	○	○						●	●			
	2QP-CNGM120408MW-HS		3.1	2	○	○						●	●			
	4QS-CNGG120408MW-HS		2.8	4	○	○						●	●			
	2QP-CNGM120412-HP	1.2	2.4	2		○					●	●	●	●	●	
	4QS-CNGG120412-HP		2.2	4		○					●					
	2QP-CNGM120412FW-HP		2.4	2	○	○					●					
	4QS-CNGG120412FW-HP		2.1	4	○	○					●					
	2QP-CNGM120412MW-HP		3.4	2	○	○					●	●	●			
	4QS-CNGG120412MW-HP		3.9	4	○	○					●	●	●			
	2QP-CNGM120412-HS		2.4	2		○						●	●	●		
	4QS-CNGG120412-HS		2.2	4		○						●	●	●		
	2QP-CNGM120412FW-HS		2.4	2	○	○						●	●			
	2QP-CNGM120412MW-HS		3.4	2	○	○						●	●			
	4QS-CNGG120412MW-HS		3.9	4	○	○						●	●			
Medium cutting	2QP-CNGM120408-HF	0.8	2.2	2		○							●			●
	4QS-CNGG120408-HF		1.8	4		○							●			
	2QP-CNGM120408-HM		2.2	2		○							●			●
	4QS-CNGG120408-HM		1.5	4		○							●			
	2QP-CNGM120412-HF	1.2	2.4	2		○							●			●
	4QS-CNGG120412-HF		2.2	4		○							●			
	2QP-CNGM120412-HM		2.4	2		○							●			●
	4QS-CNGG120412-HM		1.7	4		○							●			

● : New product
● : Line up

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

DN



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

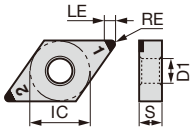
55° Rhombic with hole

K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	2QP-DNGA110404	0.4	2.5	2		○					●	●
	2QP-DNGA110408	0.8	2.1	2		○					●	●
	2QP-DNGA110412	1.2	2	2		○					●	●

● : Line up

DN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

55° Rhombic with hole

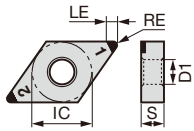
K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-DNGA150402-LF	0.2	2.7	2			○					●	●			
	4QS-DNGA150402-LF		2.2	4			○					●	●			
	2QP-DNGA150402-L		2.7	2				○				●	●			
	2QP-DNGA150404LF	0.4	2.5	2			○				●					
	2QP-DNGA150404-LF		2.5	2			○					●	●			
	4QS-DNGA150404LF		2	4			○				●					
	4QS-DNGA150404-LF		2	4			○					●	●			
	2QP-DNGA150404-L		2.5	2				○				●	●		●	●
	2QP-DNGA150404SF		2.5	2				○			●					
	4QS-DNGA150404SF		2	4				○			●					
	2QP-DNGA150404WJ		2.5	2	○	○							●		●	●
	2QP-DNGA150408LF	0.8	2.1	2			○				●					
	2QP-DNGA150408-LF		2.1	2			○					●	●			
	4QS-DNGA150408LF		1.6	4			○				●					
	4QS-DNGA150408-LF		1.6	4			○					●	●			
	2QP-DNGA150408-L		2.1	2				○				●	●		●	●
	2QP-DNGA150408SF		2.1	2				○			●					
	4QS-DNGA150408SF		1.6	4				○			●					
	2QP-DNGA150408WJ		2.1	2	○	○							●		●	●
	2QP-DNGA150412-LF	1.2	2	2			○					●	●			
	4QS-DNGA150412-LF		1.6	4			○					●	●			
	2QP-DNGA150412-L		2	2				○				●	●			●
Finishing	2QP-DNGA150402	0.2	2.7	2		○						●	●			
	4QS-DNGA150402		2.2	4		○						●	●			
	2QP-DNGA150402-LC		2.7	2					○			●	●			
	4QS-DNGA150402-LC		2.2	4					○			●	●			

● : New product
● : Line up

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

DN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

55° Rhombic with hole

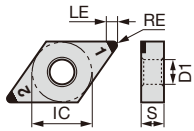
K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Finishing	2QP-DNGA150404	0.4	2.5	2		○						●	●		●	●
	2QP-DNGA150404SR		2.5	2		○					●			●		
	4QS-DNGA150404		2	4		○						●	●			
	4QS-DNGA150404SR		2	4		○					●			●		
	2QP-DNGA150404LC		2.5	2					○		●					
	2QP-DNGA150404-LC		2.5	2					○			●	●			
	4QS-DNGA150404LC		2	4					○		●					
	4QS-DNGA150404-LC		2	4					○			●	●			
	2QP-DNGA150408	0.8	2.1	2		○						●	●		●	●
	2QP-DNGA150408SR		2.1	2		○					●			●		
	4QS-DNGA150408		1.6	4		○						●	●			
	4QS-DNGA150408SR		1.6	4		○					●			●		
	2QP-DNGA150408LC		2.1	2					○		●					
	2QP-DNGA150408-LC		2.1	2					○			●	●			
	4QS-DNGA150408LC		1.6	4					○		●					
	4QS-DNGA150408-LC		1.6	4					○			●	●			
	2QP-DNGA150412	1.2	2	2		○						●	●		●	●
	2QP-DNGA150412SR		2	2		○								●		
	4QS-DNGA150412		1.6	4		○						●	●			
	4QS-DNGA150412SR		1.6	4		○								●		
	2QP-DNGA150412-LC		2	2					○			●	●			
	4QS-DNGA150412-LC		1.6	4					○			●	●			
	2QP-DNGA150416	1.6	3.4	2		○						●	●			
	2QP-DNGA150416SR		3.4	2		○								●		
	2QP-DNGA150420	2	3	2		○						●	●			
	2QP-DNGA150420SR		3	2		○								●		
	2QP-DNGA150424	2.4	2.6	2		○						●	●			
	2QP-DNGA150424SR		2.6	2		○								●		
Medium cutting	2QP-DNGA150404-H	0.4	2.5	2						○		●	●			●
	2QP-DNGA150404HC		2.5	2						○				●		
	4QS-DNGA150404-H		2	4						○		●	●			
	4QS-DNGA150404HC		2	4						○				●		
	2QP-DNGA150408-H	0.8	2.1	2						○		●	●			●
	2QP-DNGA150408HC		2.1	2						○				●		
	4QS-DNGA150408-H		1.6	4						○		●	●			
	4QS-DNGA150408HC		1.6	4						○				●		
	2QP-DNGA150412-H	1.2	2	2						○		●	●			●
	2QP-DNGA150412HC		2	2						○				●		
	4QS-DNGA150412-H		1.6	4						○		●	●			
	4QS-DNGA150412HC		1.6	4						○				●		
	2QP-DNGA150416HC	1.6	3.4	2						○				●		
	2QP-DNGA150420HC	2	3	2						○				●		
	2QP-DNGA150424HC	2.4	2.6	2						○				●		

● : New product
● : Line up

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

DN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

55° Rhombic with hole

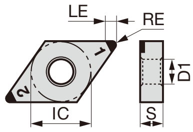
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ᑕ	✣	●	●ᑕ
	Sintered alloy						

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	4QS-DNGG150402-HP	0.2	2.1	4		○							●			
	2QP-DNGM150404-HP	0.4	2.5	2		○					●	●	●	●	●	
	4QS-DNGG150404-HP		2	4		○					●	●	●	●		
	2QP-DNGM150404-HS		2.5	2		○						●	●	●		
	4QS-DNGG150404-HS		2	4		○						●	●	●		
	2QP-DNGM150408-HP	0.8	2.1	2		○					●	●	●	●	●	
	4QS-DNGG150408-HP		1.6	4		○					●	●	●	●		
	2QP-DNGM150408-HS		2.1	2		○						●	●	●		
	4QS-DNGG150408-HS		1.6	4		○						●	●	●		
	2QP-DNGM150412-HP	1.2	2	2		○						●	●	●		
	2QP-DNGM150412-HS		2	2		○						●	●	●		
	4QS-DNGG150412-HS		1.6	4		○						●	●	●		
Medium cutting	2QP-DNGM150408-HF	0.8	2.1	2		○							●			●
	4QS-DNGG150408-HF		2	4		○							●			
	2QP-DNGM150408-HM		2.1	2		○										●
	4QS-DNGG150408-HM		1.6	4		○							●			
	2QP-DNGM150412-HF	1.2	2	2		○							●			●
	4QS-DNGG150412-HF		2.6	4		○							●			
	2QP-DNGM150412-HM		2	2		○										●

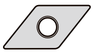
● : New product
● : Line up

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

DN



IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm



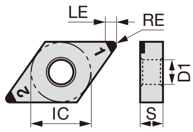
55° Rhombic with hole

K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●◐	✣	●	●◐
	Sintered alloy						

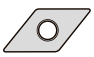
Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-DNGA150604-LF	0.4	2.5	2			○					●	●			
	2QP-DNGA150604-L		2.5	2				○				●	●			
	2QP-DNGA150608-LF	0.8	2.1	2			○					●	●			
	2QP-DNGA150608-L		2.1	2				○				●	●			
	2QP-DNGA150612-LF	1.2	2	2			○					●	●			
	2QP-DNGA150612-L		2	2				○				●	●			
Finishing	2QP-DNGA150604	0.4	2.5	2		○						●	●		●	●
	2QP-DNGA150604SR		2.5	2		○					● (red)			●		
	2QP-DNGA150604-LC		2.5	2					○			●	●			
	2QP-DNGA150608	0.8	2.1	2		○						●	●		●	●
	2QP-DNGA150608SR		2.1	2		○					● (red)			●		
	2QP-DNGA150608-LC		2.1	2					○			●	●			
	2QP-DNGA150612	1.2	2	2		○						●	●		●	●
	2QP-DNGA150612SR		2	2		○								●		
	2QP-DNGA150612-LC		2	2					○			●	●			
Medium cutting	2QP-DNGA150604-H	0.4	2.5	2						○		●	●			
	2QP-DNGA150604HC		2.5	2						○				●		
	2QP-DNGA150608-H	0.8	2.1	2						○		●	●			
	2QP-DNGA150608HC		2.1	2						○				●		
	2QP-DNGA150612-H	1.2	2	2						○		●	●			
	2QP-DNGA150612HC		2	2						○				●		

● (red) : New product
● : Line up

DN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm



55° Rhombic with hole

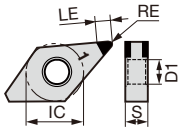
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●◐	✣	●
	Sintered alloy					

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	2QP-DNGM150608-HP	0.8	2.1	2		○					● (red)	●	●	●	●
	2QP-DNGM150608-HS		2.1	2		○						●	●	●	

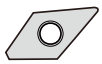
● (red) : New product
● : Line up

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

FN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm



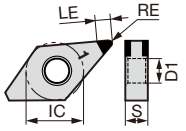
45° Rhombic with hole

K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

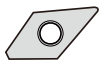
Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-FNGA150404-LF	0.4	2.6	2			○				●
	2QP-FNGA150404-L		2.6	2				○			●
	2QP-FNGA150408-LF	0.8	3	2			○				●
	2QP-FNGA150408-L		3	2				○			●
	2QP-FNGA150412-LF	1.2	3.3	2			○				●
	2QP-FNGA150412-L		3.3	2				○			●
Finishing	2QP-FNGA150402	0.2	2.8	2		○					●
	2QP-FNGA150404	0.4	2.6	2		○					●
	2QP-FNGA150404-LC		2.6	2					○		●
	2QP-FNGA150408	0.8	3	2		○					●
	2QP-FNGA150408-LC		3	2					○		●
	2QP-FNGA150412	1.2	3.3	2		○					●
	2QP-FNGA150412-LC		3.3	2					○		●
Medium cutting	2QP-FNGA150404-H	0.4	2.6	2						○	●
	2QP-FNGA150408-H	0.8	3	2						○	●
	2QP-FNGA150412-H	1.2	3.3	2						○	●

● : Line up

FN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm



45° Rhombic with hole

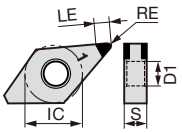
K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-FNGG150404-HP	0.4	2.6	2		○					●
	2QP-FNGG150408-HP	0.8	3	2		○					●
	2QP-FNGG150412-HP	1.2	3.3	2		○					●

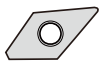
● : Line up

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

FN



IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm



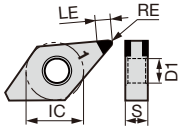
45° Rhombic with hole

K	Cast iron	
S	Superalloy	
H	Hard material	●ᑕ
	Sintered alloy	

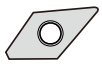
Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-FNGA150604-LF	0.4	2.6	2			○				●
	2QP-FNGA150604-L		2.6	2				○			●
	2QP-FNGA150608-LF	0.8	3	2			○				●
	2QP-FNGA150608-L		3	2				○			●
	2QP-FNGA150612-LF	1.2	3.3	2			○				●
	2QP-FNGA150612-L		3.3	2				○			●
Finishing	2QP-FNGA150604	0.4	2.6	2		○					●
	2QP-FNGA150604-LC		2.6	2					○		●
	2QP-FNGA150608	0.8	3	2		○					●
	2QP-FNGA150608-LC		3	2					○		●
	2QP-FNGA150612	1.2	3.3	2		○					●
	2QP-FNGA150612-LC		3.3	2					○		●
Medium cutting	2QP-FNGA150604-H	0.4	2.6	2						○	●
	2QP-FNGA150608-H	0.8	3	2						○	●
	2QP-FNGA150612-H	1.2	3.3	2						○	●

● : Line up

FN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm



45° Rhombic with hole

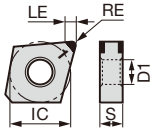
K	Cast iron	
S	Superalloy	
H	Hard material	●ᑕ
	Sintered alloy	

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-FNGG150604-HP	0.4	2.6	2		○					●
	2QP-FNGG150608-HP	0.8	3	2		○					●
	2QP-FNGG150612-HP	1.2	3.3	2		○					●

● : Line up

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

GN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

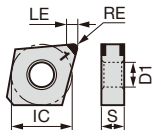
70° Rhombic with hole

K	Cast iron	
S	Superalloy	
H	Hard material	● ● ●ⓒ ✣ ●ⓒ
	Sintered alloy	

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM20
Precision finishing	2QP-GNGA120402-LF	0.2	2.2	2			○					●	●		
	2QP-GNGA120402-L		2.2	2				○				●	●		
	2QP-GNGA120404-LF	0.4	2.1	2			○					●	●		
	2QP-GNGA120404-L		2.1	2				○				●	●		
	2QP-GNGA120408-LF	0.8	2.1	2			○					●	●		
	2QP-GNGA120408-L		2.1	2				○				●	●		
	2QP-GNGA120412-LF	1.2	2.2	2			○					●	●		
	2QP-GNGA120412-L		2.2	2				○				●	●		
Finishing	2QP-GNGA120402	0.2	2.2	2		○						●	●		
	2QP-GNGA120402-LC		2.2	2					○			●	●		
	2QP-GNGA120404	0.4	2.1	2		○						●	●		●
	2QP-GNGA120404SR		2.1	2		○					●			●	
	2QP-GNGA120404-LC		2.1	2					○			●	●		
	2QP-GNGA120408	0.8	2.1	2		○						●	●		●
	2QP-GNGA120408SR		2.1	2		○					●			●	
	2QP-GNGA120408-LC		2.1	2					○			●	●		
	2QP-GNGA120412	1.2	2.2	2		○						●	●		●
	2QP-GNGA120412SR		2.2	2		○					●			●	
	2QP-GNGA120412-LC		2.2	2					○			●	●		
Medium cutting	2QP-GNGA120404-H	0.4	2.1	2						○		●	●		
	2QP-GNGA120404HC		2.1	2						○				●	
	2QP-GNGA120408-H	0.8	2.1	2						○		●	●		
	2QP-GNGA120408HC		2.1	2						○				●	
	2QP-GNGA120412-H	1.2	2.2	2						○		●	●		
	2QP-GNGA120412HC		2.2	2						○				●	

● : New product
● : Line up

GN with chipbreaker



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

70° Rhombic with hole

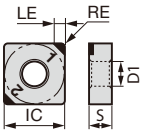
K	Cast iron	
S	Superalloy	
H	Hard material	● ●ⓒ ●
	Sintered alloy	

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10
Precision finishing	2QP-GNGG120404-HP	0.4	2.1	2		○					●	●	●
	2QP-GNGG120404-HS		2.1	2		○					●	●	
	2QP-GNGG120408-HP	0.8	2.1	2		○					●	●	●
	2QP-GNGG120408-HS		2.1	2		○					●	●	
	2QP-GNGG120412-HP	1.2	2.2	2		○					●	●	●
	2QP-GNGG120412-HS		2.2	2		○					●	●	

● : Line up

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

SN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

Square with hole

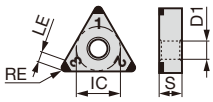
		BXA10	BXA20	BR35F	BXM20
K	Cast iron	●	●ⓒ	✣	●ⓒ
S	Superalloy				
H	Hard material				
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BR35F	BXM20
Precision finishing	2QP-SNGA120408-LF	0.8	2.4	2			○				●	●		
	2QP-SNGA120408-L		2.4	2				○			●	●		●
	2QP-SNGA120412-LF	1.2	2.4	2			○				●	●		
	2QP-SNGA120412-L		2.4	2				○			●	●		●
Finishing	2QP-SNGA120404	0.4	2.4	2		○					●	●		●
	4QS-SNGA120404		1.8	4		○					●	●		
	2QP-SNGA120408	0.8	2.4	2		○					●	●		●
	2QP-SNGA120408SR		2.4	2		○							●	
	4QS-SNGA120408		1.8	4		○					●	●		
	4QS-SNGA120408SR		1.8	4		○							●	
	2QP-SNGA120412	1.2	2.4	2		○					●	●		●
	2QP-SNGA120412SR		2.4	2		○							●	
	4QS-SNGA120412		1.8	4		○					●	●		
	4QS-SNGA120412SR		1.8	4		○							●	
Medium cutting	2QP-SNGA120408-H	0.8	2.4	2						○		●		●
	2QP-SNGA120412-H	1.2	2.4	2						○		●		●

● : Line up

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

TN



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

Triangular with hole

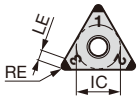
K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	3QP-TNGA160402-LF	0.2	2.3	3			○					●	●			
	3QP-TNGA160402-L		2.3	3				○				●	●			
	3QP-TNGA160404LF	0.4	2.2	3			○				●					
	3QP-TNGA160404-LF		2.2	3			○					●	●			
	6QS-TNGA160404LF		1.9	6			○				●					
	6QS-TNGA160404-LF		1.9	6			○					●	●			
	3QP-TNGA160404-L		2.2	3				○				●	●		●	●
	3QP-TNGA160404SF		2.2	3				○			●					
	6QS-TNGA160404SF		1.9	6				○			●					
	3QP-TNGA160404WG		2.4	3	○	○						●	●			●
	3QP-TNGA160408LF	0.8	1.9	3			○				●					
	3QP-TNGA160408-LF		1.9	3			○					●	●			
	6QS-TNGA160408LF		1.6	6			○				●					
	6QS-TNGA160408-LF		1.6	6			○					●	●			
	3QP-TNGA160408-L		1.9	3				○				●	●		●	●
	3QP-TNGA160408SF		1.9	3				○			●					
	6QS-TNGA160408SF		1.6	6				○			●					
	3QP-TNGA160408WG		2.2	3	○	○						●	●		●	●
	3QP-TNGA160412LF	1.2	2.4	3			○				●					
	3QP-TNGA160412-LF		2.4	3			○					●	●			
	6QS-TNGA160412LF		1.8	6			○				●					
	6QS-TNGA160412-LF		1.8	6			○					●	●			
	3QP-TNGA160412-L		2.4	3				○				●	●		●	●
	3QP-TNGA160412SF		2.4	3				○			●					
	6QS-TNGA160412SF		1.8	6				○			●					
Finishing	3QP-TNGA160402	0.2	2.3	3		○						●	●			
	3QP-TNGA160402-LC		2.3	3					○			●	●			
	3QP-TNGA160404	0.4	2.2	3		○						●	●		●	●
	3QP-TNGA160404SR		2.2	3		○					●			●		
	6QS-TNGA160404		1.9	6		○						●	●			
	6QS-TNGA160404SR		1.9	6		○					●			●		
	3QP-TNGA160404LC		2.2	3					○		●					
	3QP-TNGA160404-LC		2.2	3					○			●	●			
	6QS-TNGA160404LC		1.9	6					○		●					
	6QS-TNGA160404-LC		1.9	6					○			●	●			

● : New product
● : Line up

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

TN



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

Triangular with hole

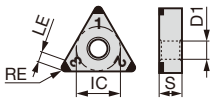
K	Cast iron
S	Superalloy
H	Hard material
	Sintered alloy

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Finishing	3QP-TNGA160408	0.8	1.9	3		○						●	●		●	●
	3QP-TNGA160408SR		1.9	3		○					●			●		
	6QS-TNGA160408		1.6	6		○						●	●			
	6QS-TNGA160408SR		1.6	6		○					●			●		
	3QP-TNGA160408LC		1.9	3					○		●					
	3QP-TNGA160408-LC		1.9	3					○			●	●			
	6QS-TNGA160408LC		1.6	6					○		●					
	6QS-TNGA160408-LC		1.6	6					○			●	●			
	3QP-TNGA160412	1.2	2.4	3		○						●	●		●	●
	3QP-TNGA160412SR		2.4	3		○					●			●		
	6QS-TNGA160412		1.8	6		○						●	●			
	6QS-TNGA160412SR		1.8	6		○					●			●		
	3QP-TNGA160412LC		2.4	3					○		●					
	3QP-TNGA160412-LC		2.4	3					○			●	●			
	6QS-TNGA160412LC		1.8	6					○		●					
	6QS-TNGA160412-LC		1.8	6					○			●	●			
	3QP-TNGA160416	1.6	3.3	3		○						●	●			
	3QP-TNGA160416SR		3.3	3		○								●		
	3QP-TNGA160420	2	3	3		○						●	●			
	3QP-TNGA160420SR		3	3		○								●		
	3QP-TNGA160424	2.4	2.7	3		○						●	●			
	3QP-TNGA160424SR		2.7	3		○								●		
Medium cutting	3QP-TNGA160404-H	0.4	2.2	3						○		●	●			●
	3QP-TNGA160404HC		2.2	3						○				●		
	6QS-TNGA160404-H		1.9	6						○		●	●			
	6QS-TNGA160404HC		1.9	6						○				●		
	3QP-TNGA160408-H	0.8	1.9	3						○		●	●			●
	3QP-TNGA160408HC		1.9	3						○				●		
	6QS-TNGA160408-H		1.6	6						○		●	●			
	6QS-TNGA160408HC		1.6	6						○				●		
	3QP-TNGA160412-H	1.2	2.4	3						○		●	●			●
	3QP-TNGA160412HC		2.4	3						○				●		
	6QS-TNGA160412-H		1.8	6						○		●	●			
	6QS-TNGA160412HC		1.8	6						○				●		
	3QP-TNGA160416HC	1.6	3.3	3						○				●		
	3QP-TNGA160420HC	2	3	3						○				●		
	3QP-TNGA160424HC	2.4	2.7	3						○				●		

● : New product
● : Line up

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

TN with chipbreaker



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

Triangular with hole

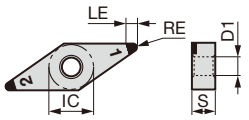
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ᑕ	✣	●	●ᑕ
	Sintered alloy						

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	6QS-TNGG160402-HP	0.2	2.1	6		○							●			
	3QP-TNGM160404-HP	0.4	2.2	3		○					●	●	●	●	●	
	6QS-TNGG160404-HP		1.9	6		○					●	●	●	●		
	3QP-TNGM160404-HS		2.2	3		○						●	●	●		
	6QS-TNGG160404-HS		1.9	6		○						●	●	●		
	3QP-TNGM160408-HP	0.8	1.9	3		○					●	●	●	●	●	
	6QS-TNGG160408-HP		1.6	6		○					●	●	●	●		
	3QP-TNGM160408-HS		1.9	3		○						●	●	●		
	6QS-TNGG160408-HS		1.6	6		○						●	●	●		
	3QP-TNGM160412-HP	1.2	2.4	3		○					●	●	●	●		
	6QS-TNGG160412-HP		1.8	6		○					●	●	●	●		
	3QP-TNGM160412-HS		2.4	3		○						●	●	●		
	6QS-TNGG160412-HS		1.8	6		○						●	●	●		
Medium cutting	3QP-TNGM160408-HF	0.8	1.9	3		○							●			●
	6QS-TNGG160408-HF		2.1	4		○							●			
	3QP-TNGM160408-HM		1.9	3		○										●
	6QS-TNGG160408-HM		1.6	6		○							●			
	3QP-TNGM160412-HF	1.2	2.4	3		○							●			●
	6QS-TNGG160412-HF		2.5	4		○							●			
	3QP-TNGM160412-HM		2.4	3		○										●

● : New product
● : Line up

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

VN



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

35° Rhombic with hole

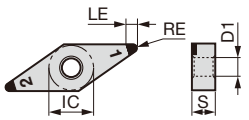
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron	●	●	●ᑕ	✣	●	●ᑕ
S	Superalloy						
H	Hard material						
	Sintered alloy						

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-VNGA160402-LF	0.2	3.5	2			○					●	●			
	4QS-VNGA160402-LF		3	4			○					●	●			
	2QP-VNGA160402-L		3.5	2				○				●	●			
	2QP-VNGA160404LF	0.4	3.1	2			○				●					
	2QP-VNGA160404-LF		3.1	2			○					●	●			
	4QS-VNGA160404LF		2.6	4			○				●					
	4QS-VNGA160404-LF		2.6	4			○					●	●			
	2QP-VNGA160404-L		3.1	2				○				●	●		●	●
	2QP-VNGA160404SF		3.1	2				○			●					
	4QS-VNGA160404SF		2.6	4				○			●					
	2QP-VNGA160408LF	0.8	2.2	2			○				●					
	2QP-VNGA160408-LF		2.2	2			○					●	●			
	4QS-VNGA160408LF		1.7	4			○				●					
	4QS-VNGA160408-LF		1.7	4			○					●	●			
	2QP-VNGA160408-L		2.2	2				○				●	●		●	●
	2QP-VNGA160408SF		2.2	2				○			●					
	4QS-VNGA160408SF		1.7	4				○			●					
	2QP-VNGA160412-LF	1.2	3	2			○					●	●			
	4QS-VNGA160412-LF		1.7	4			○					●	●			
	2QP-VNGA160412-L		3	2				○				●	●			
Finishing	2QP-VNGA160402	0.2	3.5	2		○						●	●			
	4QS-VNGA160402		3	4		○						●	●			
	2QP-VNGA160402-LC		3.5	2					○			●	●			
	4QS-VNGA160402-LC		3	4					○			●	●			
	2QP-VNGA160404	0.4	3.1	2		○						●	●		●	●
	2QP-VNGA160404SR		3.1	2		○					●			●		
	4QS-VNGA160404		2.6	4		○						●	●			
	4QS-VNGA160404SR		2.6	4		○					●			●		
	2QP-VNGA160404LC		3.1	2					○		●					
	2QP-VNGA160404-LC		3.1	2					○			●	●			
	4QS-VNGA160404LC		2.6	4					○		●					
	4QS-VNGA160404-LC		2.6	4					○			●	●			
	2QP-VNGA160408	0.8	2.2	2		○						●	●		●	●
	2QP-VNGA160408SR		2.2	2		○					●			●		
	4QS-VNGA160408		1.7	4		○						●	●			
	4QS-VNGA160408SR		1.7	4		○					●			●		
	2QP-VNGA160408LC		2.2	2					○		●					
	2QP-VNGA160408-LC		2.2	2					○			●	●			
	4QS-VNGA160408LC		1.7	4					○		●					
	4QS-VNGA160408-LC		1.7	4					○			●	●			
	2QP-VNGA160412	1.2	3	2		○						●	●			●
	4QS-VNGA160412		1.7	4		○						●	●			
	2QP-VNGA160412-LC		3	2					○			●	●			
	4QS-VNGA160412-LC		1.7	4					○			●	●			
Medium cutting	2QP-VNGA160404-H	0.4	3.1	2						○		●	●			●
	2QP-VNGA160404HC		3.1	2						○				●		
	4QS-VNGA160404-H		2.6	4						○		●	●			
	4QS-VNGA160404HC		2.6	4						○				●		
	2QP-VNGA160408-H	0.8	2.2	2						○		●	●			●
	2QP-VNGA160408HC		2.2	2						○				●		
	4QS-VNGA160408-H		1.7	4						○		●	●			
	4QS-VNGA160408HC		1.7	4						○				●		
	2QP-VNGA160412-H	1.2	3	2						○		●	●			
	4QS-VNGA160412-H		1.7	4						○		●	●			

● : New product
● : Line up

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

VN with chipbreaker



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

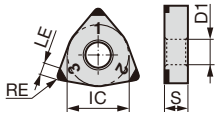
35° Rhombic with hole

		BM05M	BXA10	BXA20	BXM10	BXM20
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●◐	●	●◐
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BXM10	BXM20
Precision finishing	4QS-VNGG160402-HP	0.2	3	4		○							●		
	2QP-VNGM160404-HP	0.4	3.1	2		○					●	●	●		
	4QS-VNGG160404-HP		2.6	4		○					●	●	●		
	2QP-VNGM160404-HS		3.1	2		○						●	●		
	4QS-VNGG160404-HS		2.6	4		○						●	●		
	2QP-VNGM160408-HP	0.8	2.2	2		○					●	●	●	●	
	4QS-VNGG160408-HP		1.7	4		○					●	●	●		
	2QP-VNGM160408-HS		2.2	2		○						●	●		
	4QS-VNGG160408-HS		1.7	4		○						●	●		
Medium cutting	2QP-VNGM160408-HF	0.8	2.2	2		○									●
	2QP-VNGM160408-HM		2.2	2		○									●
	4QS-VNGG160408-HM		1.7	4		○							●		

● : New product
● : Line up

WN



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

80° Trigon with hole

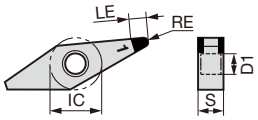
		BM05M	BXA10	BXA20	BXM10	BXM20
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●◐	●	●◐
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BXM10	BXM20
Precision finishing	3QP-WNGA080408-LF	0.8	2.2	3			○					●	●		
	6QS-WNGA080408-LF		1.5	6			○					●	●		
	3QP-WNGA080408-L		2.2	3				○				●	●		
	3QP-WNGA080408FW		2.2	3	○	○						●	●	●	●
	6QS-WNGA080408FW		1.8	6	○	○						●	●		
	3QP-WNGA080408MW		3.1	3	○	○						●	●		
Finishing	3QP-WNGA080404	0.4	2.3	3		○						●	●		
	6QS-WNGA080404		1.6	6		○						●	●		
	3QP-WNGA080408	0.8	2.2	3		○						●	●	●	●
	3QP-WNGA080408SR		2.2	3		○					●				
	6QS-WNGA080408		1.5	6		○						●	●		
	6QS-WNGA080408SR		1.5	6		○					●				
	3QP-WNGA080412	1.2	2.4	3		○						●	●		
	6QS-WNGA080412		1.7	6		○						●	●		
Medium cutting	3QP-WNGA080408-H	0.8	2.2	3						○		●	●		
	6QS-WNGA080408-H		1.5	6						○		●	●		

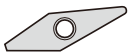
● : New product
● : Line up

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

YN



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm



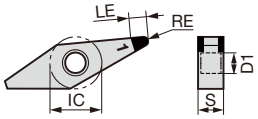
25° Rhombic with hole

K	Cast iron	
S	Superalloy	
H	Hard material	●ⓒ
	Sintered alloy	

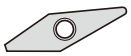
Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-YNGA160404-LF	0.4	3.1	2			○				●
	2QP-YNGA160404-L		3.1	2				○			●
	2QP-YNGA160408-LF	0.8	3	2			○				●
	2QP-YNGA160408-L		3	2				○			●
Finishing	2QP-YNGA160402	0.2	3.5	2		○					●
	2QP-YNGA160404	0.4	3.1	2		○					●
	2QP-YNGA160404-LC		3.1	2					○		●
	2QP-YNGA160408	0.8	3	2		○					●
	2QP-YNGA160408-LC		3	2					○		●

● : Line up

YN with chipbreaker



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm



25° Rhombic with hole

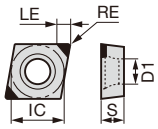
K	Cast iron	
S	Superalloy	
H	Hard material	●ⓒ
	Sintered alloy	

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA20
Precision finishing	2QP-YNGG160402-HP	0.2	3.5	2		○					●
	2QP-YNGG160404-HP	0.4	3.1	2		○					●
	2QP-YNGG160408-HP	0.8	3	2		○					●

● : Line up

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

CC



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

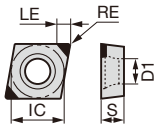
80°Rhombic with hole, Positive 7°

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ᑕ	✣	●	●ᑕ
	Sintered alloy						

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-CCGW060202LF	0.2	2.3	2			○				●					
	2QP-CCGW060202-LF		2.3	2			○					●	●			
	2QP-CCGW060202-L		2.3	2				○				●	●			
	2QP-CCGW060202SF		2.3	2				○			●					
	2QP-CCGW060204LF	0.4	2.3	2			○				●					
	2QP-CCGW060204-LF		2.3	2			○					●	●			
	2QP-CCGW060204-L		2.3	2				○				●	●			
	2QP-CCGW060204SF		2.3	2				○			●					
	2QP-CCGW060204FW		2.3	2	○	○					●					
	2QP-CCGW060208-LF	0.8	2.2	2			○					●	●			
	2QP-CCGW060208-L		2.2	2				○				●	●			
Finishing	2QP-CCGW060202	0.2	2.3	2		○						●	●		●	●
	2QP-CCGW060202SR		2.3	2		○					●					
	2QP-CCGW060202LC		2.3	2					○		●					
	2QP-CCGW060202-LC		2.3	2					○			●	●			
	2QP-CCGW060204	0.4	2.3	2		○						●	●		●	●
	2QP-CCGW060204SR		2.3	2		○					●			●		
	2QP-CCGW060204LC		2.3	2					○		●					
	2QP-CCGW060204-LC		2.3	2					○			●	●			
	2QP-CCGW060208	0.8	2.2	2		○						●	●			
	2QP-CCGW060208SR		2.2	2		○								●		
	2QP-CCGW060208-LC		2.2	2					○			●	●			

● : New product
● : Line up

CC with chipbreaker



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

80°Rhombic with hole, Positive 7°

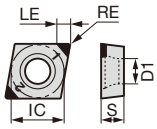
		BM05M	BXA10	BXA20	BR35F	BXM10
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●ᑕ	✣	●
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	2QP-CCGT060202-HP	0.2	2.3	2		○							●		
	2QP-CCGT060204-HP	0.4	2.3	2		○					●	●	●	●	●
	2QP-CCGT060204FW-HP		2.2	2	○	○					●				
	2QP-CCGT060204-HS		2.2	2		○						●	●	●	

● : New product
● : Line up

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

CC



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

80°Rhombic with hole, Positive 7°

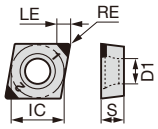
		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron	●	●	●ᑕ	✣	●	●ᑕ
S	Superalloy						
H	Hard material						
	Sintered alloy						

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	**2QP-CCGW09T302-LF**	0.2	2.3	2			○					●	●			
	2QP-CCGW09T3**02-L**		2.3	2				○				●	●			
	2QP-CCGW09T3**04LF**	0.4	2.3	2			○				●					
	2QP-CCGW09T3**04-LF**		2.3	2			○					●	●			
	2QP-CCGW09T3**04-L**		2.3	2				○				●	●			
	2QP-CCGW09T3**04SF**		2.3	2				○			●					
	2QP-CCGW09T3**04FW**		2.3	2	○	○					●	●	●			
	2QP-CCGW09T3**04MW**		3	2	○	○					●	●	●			
	2QP-CCGW09T3**08LF**	0.8	2.2	2			○				●					
	2QP-CCGW09T3**08-LF**		2.2	2			○					●	●			
	2QP-CCGW09T3**08-L**		2.2	2				○				●	●			
	2QP-CCGW09T3**08SF**		2.2	2				○			●					
	2QP-CCGW09T3**08FW**		2.2	2	○	○					●	●	●			
	2QP-CCGW09T3**08MW**		3	2	○	○					●	●	●			
Finishing	2QP-CCGW09T3**02**	0.2	2.3	2		○						●	●			
	2QP-CCGW09T3**02-LC**		2.3	2					○			●	●			
	2QP-CCGW09T3**04**	0.4	2.3	2		○						●	●		●	●
	2QP-CCGW09T3**04SR**		2.3	2		○					●			●		
	2QP-CCGW09T3**04LC**		2.3	2					○		●					
	2QP-CCGW09T3**04-LC**		2.3	2					○			●	●			
	2QP-CCGW09T3**08**	0.8	2.2	2		○						●	●		●	●
	2QP-CCGW09T3**08SR**		2.2	2		○					●			●		
	2QP-CCGW09T3**08LC**		2.2	2					○		●					
	2QP-CCGW09T3**08-LC**		2.2	2					○			●	●			
Medium cutting	2QP-CCGW09T3**02-H**	0.2	2.3	2						○			●			
	2QP-CCGW09T3**04-H**	0.4	2.3	2						○			●			
	2QP-CCGW09T3**04HC**		2.3	2						○				●		
	2QP-CCGW09T3**08-H**	0.8	2.2	2						○			●			
	2QP-CCGW09T3**08HC**		2.2	2						○				●		

● : New product
● : Line up

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

CC with chipbreaker



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

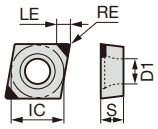
80°Rhombic with hole, Positive 7°

		BM05M	BXA10	BXA20	BR35F	BXM10
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●ⓒ	✣	●
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	2QP-CCGT09T302-HP	0.2	2.3	2		○							●		
	2QP-CCGT09T304-HP	0.4	2.3	2		○					●	●	●	●	●
	2QP-CCGT09T304FW-HP		2.3	2	○	○					●	●			●
	2QP-CCGT09T304MW-HP		3	2	○	○					●	●	●		
	2QP-CCGT09T304-HS		2.2	2		○						●	●	●	
	2QP-CCGT09T304FW-HS		2.2	2	○	○						●	●		
	2QP-CCGT09T308-HP	0.8	2.2	2		○					●	●	●	●	●
	2QP-CCGT09T308FW-HP		2.2	2	○	○					●	●			●
	2QP-CCGT09T308MW-HP		2.9	2	○	○					●	●	●		
	2QP-CCGT09T308-HS		2.2	2		○						●	●	●	
	2QP-CCGT09T308FW-HS		2.1	2	○	○						●	●		

● : New product
● : Line up

CP



IC : 7.94 mm
D1 : 3.4 mm
S : 2.38 mm

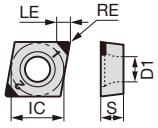
80° Rhombic with hole, Positive 11°

		BXA10	BXA20
K	Cast iron		
S	Superalloy		
H	Hard material	●	●ⓒ
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	2QP-CPGW080202	0.2	2.3	2		○					●	●
	2QP-CPGW080204	0.4	2.3	2		○					●	●
	2QP-CPGW080208	0.8	2.2	2		○					●	●

● : Line up

CP



IC : 9.525 mm
D1 : 4.4 mm
S : 3.18 mm

80° Rhombic with hole, Positive 11°

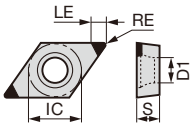
		BXA10	BXA20
K	Cast iron		
S	Superalloy		
H	Hard material	●	●ⓒ
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	2QP-CPGW090302	0.2	2.3	2		○					●	●
	2QP-CPGW090304	0.4	2.3	2		○					●	●
	2QP-CPGW090308	0.8	2.2	2		○					●	●

● : Line up

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

DC



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

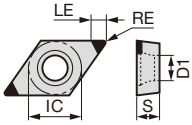
55° Rhombic with hole, Positive 7°

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron	●	●	●ⓒ	✣	●	●ⓒ
S	Superalloy						
H	Hard material						
	Sintered alloy						

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Finishing	2QP-DCGW070202LF	0.2	2.7	2			○				●					
	2QP-DCGW070202-LF		2.7	2			○					●	●			
	2QP-DCGW070202-L		2.7	2				○				●	●			
	2QP-DCGW070202SF		2.7	2				○			●					
	2QP-DCGW070204LF	0.4	2.5	2			○				●					
	2QP-DCGW070204-LF		2.5	2			○					●	●			
	2QP-DCGW070204-L		2.5	2				○				●	●			
	2QP-DCGW070204SF		2.5	2				○			●					
	2QP-DCGW070208LF	0.8	2.1	2			○				●					
	2QP-DCGW070208-LF		2.1	2			○					●	●			
	2QP-DCGW070208-L		2.1	2				○				●	●			
	2QP-DCGW070208SF		2.1	2				○			●					
Medium cutting	2QP-DCGW070202	0.2	2.7	2		○						●	●		●	●
	2QP-DCGW070202SR		2.7	2		○					●			●		
	2QP-DCGW070202LC		2.7	2					○		●					
	2QP-DCGW070202-LC		2.7	2					○			●	●			
	2QP-DCGW070204	0.4	2.5	2		○						●	●		●	●
	2QP-DCGW070204SR		2.5	2		○					●			●		
	2QP-DCGW070204LC		2.5	2					○		●					
	2QP-DCGW070204-LC		2.5	2					○			●	●			
	2QP-DCGW070208	0.8	2.1	2		○						●	●			
	2QP-DCGW070208SR		2.1	2		○					●			●		
	2QP-DCGW070208LC		2.1	2					○		●					
	2QP-DCGW070208-LC		2.1	2					○			●	●			

● : New product
● : Line up

DC with chipbreaker



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

55° Rhombic with hole, Positive 7°

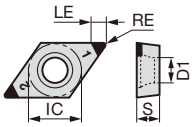
		BM05M	BXA10	BXA20	BR35F	BXM10
K	Cast iron	●	●	●ⓒ	✣	●
S	Superalloy					
H	Hard material					
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	2QP-DCGT070202-HP	0.2	2.6	2		○							●			
	2QP-DCGT070204-HP	0.4	2.5	2		○					●	●	●	●	●	
	2QP-DCGT070204-HS		2.5	2		○						●	●	●		

● : New product
● : Line up

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

DC



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

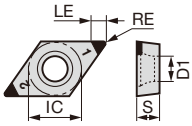
55° Rhombic with hole, Positive 7°

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●◐	✣	●	●◐
	Sintered alloy						

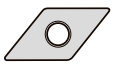
Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-DCGW11T302LF	0.2	2.7	2			○				●					
	2QP-DCGW11T302-LF		2.7	2			○					●	●			
	2QP-DCGW11T302-L		2.7	2				○				●	●			
	2QP-DCGW11T302SF		2.7	2				○			●					
	2QP-DCGW11T304LF	0.4	2.5	2			○				●					
	2QP-DCGW11T304-LF		2.5	2			○					●	●			
	2QP-DCGW11T304-L		2.5	2				○				●	●			
	2QP-DCGW11T304SF		2.5	2				○			●					
	2QP-DCGW11T308LF	0.8	2.1	2			○				●					
	2QP-DCGW11T308-LF		2.1	2			○					●	●			
	2QP-DCGW11T308-L		2.1	2				○				●	●			
	2QP-DCGW11T308SF		2.1	2				○			●					
Finishing	2QP-DCGW11T301	0.1	2.8	2		○						●	●			
	2QP-DCGW11T302	0.2	2.7	2		○						●	●		●	●
	2QP-DCGW11T302SR		2.7	2		○					●			●		
	2QP-DCGW11T302LC		2.7	2					○		●					
	2QP-DCGW11T302-LC		2.7	2					○			●	●			
	2QP-DCGW11T304	0.4	2.5	2		○						●	●		●	●
	2QP-DCGW11T304SR		2.5	2		○					●			●		
	2QP-DCGW11T304LC		2.5	2					○		●					
	2QP-DCGW11T304-LC		2.5	2					○			●	●			
	2QP-DCGW11T308	0.8	2.1	2		○						●	●		●	●
	2QP-DCGW11T308SR		2.1	2		○					●			●		
	2QP-DCGW11T308LC		2.1	2					○		●					
	2QP-DCGW11T308-LC		2.1	2					○			●	●			
Medium cutting	2QP-DCGW11T302-H	0.2	2.7	2						○			●			
	2QP-DCGW11T304-H	0.4	2.5	2						○			●			
	2QP-DCGW11T304HC		2.5	2						○				●		
	2QP-DCGW11T308-H	0.8	2.1	2						○			●			
	2QP-DCGW11T308HC		2.1	2						○				●		

● : New product
● : Line up

DC with chipbreaker



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm



55° Rhombic with hole, Positive 7°

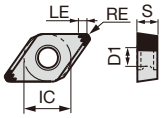
		BM05M	BXA10	BXA20	BR35F	BXM10
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●◐	✣	●
	Sintered alloy					

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	2QP-DCGT11T302-HP	0.2	2.6	2		○							●		
	2QP-DCGT11T304-HP	0.4	2.5	2		○					●	●	●	●	●
	2QP-DCGT11T304-HS		2.5	2		○						●	●	●	
	2QP-DCGT11T308-HP	0.8	2.1	2		○					●	●	●	●	●
	2QP-DCGT11T308-HS		2.1	2		○						●	●	●	

● : New product
● : Line up

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

DX



IC : 6.35 mm
D1 : 2.7 mm
S : 3.18 mm

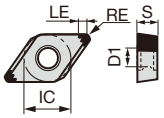
55° Rhombic with hole

		BM05M	BXA10	BXA20	BR35F
K	Cast iron				
S	Superalloy				
H	Hard material	●	●	●ⓒ	✣
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F
Finishing	**4QS-DXGQ070302SPR**	0.2	2.1	4		○					●	●	●	●
	4QS-DXGQ0703**02SPL**		2.1	4		○					●	●	●	●
	4QS-DXGQ0703**04SPR**	0.4	1.9	4		○					●	●	●	●
	4QS-DXGQ0703**04SPL**		1.9	4		○					●	●	●	●
	4QS-DXGQ0703**08SPR**	0.8	1.6	4		○					●	●	●	●
	4QS-DXGQ0703**08SPL**		1.6	4		○					●	●	●	●

● : New product
● : Line up

DX with chipbreaker



IC : 6.35 mm
D1 : 2.7 mm
S : 3.18 mm

55° Rhombic with hole

		BM05M	BXA10	BXA20	BR35F
K	Cast iron				
S	Superalloy				
H	Hard material	●	●	●ⓒ	✣
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F
Precision finishing	**4QS-DXGU070304R-HP**	0.4	2	4		○					●	●	●	●
	4QS-DXGU0703**04L-HP**		2	4		○					●	●	●	●
	4QS-DXGU0703**08R-HP**	0.8	1.6	4		○					●	●	●	●
	4QS-DXGU0703**08L-HP**		1.6	4		○					●	●	●	●

● : New product
● : Line up

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

TC

IC : 5.56 mm
D1 : 2.5 mm
S : 2.38 mm

Triangular Positive 7° with hole

		BXA10	BXA20
K	Cast iron		
S	Superalloy		
H	Hard material	●	◐
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	3QP-TCGW090202	0.2	2.3	3		○					●	●
Finishing	3QP-TCGW090204	0.4	2.2	3		○					●	●
Finishing	3QP-TCGW090208	0.8	1.9	3		○					●	●

● : Line up

TC

IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

Triangular Positive 7° with hole

		BXA10	BXA20
K	Cast iron		
S	Superalloy		
H	Hard material	●	◐
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	3QP-TCGW110202	0.2	2.3	3		○					●	●
Finishing	3QP-TCGW110204	0.4	2.2	3		○					●	●
Finishing	3QP-TCGW110208	0.8	1.9	3		○					●	●

● : Line up

TC

IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

Triangular Positive 7° with hole

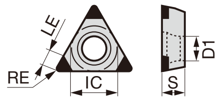
		BXA10	BXA20
K	Cast iron		
S	Superalloy		
H	Hard material	●	◐
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	3QP-TCGW16T302	0.2	2.3	3		○					●	●
Finishing	3QP-TCGW16T304	0.4	2.2	3		○					●	●
Finishing	3QP-TCGW16T308	0.8	1.9	3		○					●	●

● : Line up

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

TP



IC : 4.76 mm
D1 : 2.3 mm
S : 2.38 mm

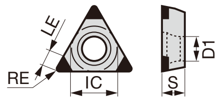
Triangular Positive 11° with hole

		BXA10	BXA20	BXM10	BXM20
K	Cast iron				
S	Superalloy				
H	Hard material	●	●◐	●	●◐
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	3QP-TPGW080202	0.2	2.3	3		○					●	●		
	3QP-TPGW080204	0.4	2.2	3		○					●	●	●	●
	3QP-TPGW080208	0.8	1.9	3		○					●	●		

● : Line up

TP



IC : 5.56 mm
D1 : 2.5 mm
S : 2.38 mm

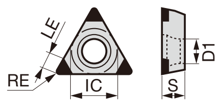
Triangular Positive 11° with hole

		BXA10	BXA20	BXM10	BXM20
K	Cast iron				
S	Superalloy				
H	Hard material	●	●◐	●	●◐
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	3QP-TPGW090202	0.2	2.3	3		○					●	●		●
	3QP-TPGW090204	0.4	2.2	3		○					●	●	●	●
	3QP-TPGW090208	0.8	1.9	3		○					●	●		

● : Line up

TP



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

Triangular Positive 11° with hole

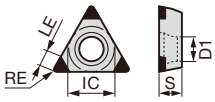
		BXA10	BXA20	BXM10	BXM20
K	Cast iron				
S	Superalloy				
H	Hard material	●	●◐	●	●◐
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	3QP-TPGW110202	0.2	2.3	3		○					●	●		●
	3QP-TPGW110204	0.4	2.2	3		○					●	●	●	●
	3QP-TPGW110208	0.8	1.9	3		○					●	●		

● : Line up

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

TP



IC : 6.35 mm
D1 : 3.4 mm
S : 3.18 mm

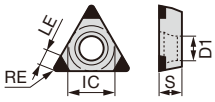
Triangular Positive 11° with hole

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●ᑕ	✣	●	●ᑕ
	Sintered alloy						

Application	Designation	RE	LE	No. of corners	Wiper	First choice	Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	3QP-TPGW110302-LF	0.2	2.3	3			○					●	●			
	3QP-TPGW110302-L		2.3	3				○				●	●			
	3QP-TPGW110304LF	0.4	2.2	3			○				●					
	3QP-TPGW110304-LF		2.2	3			○					●	●			
	3QP-TPGW110304-L		2.2	3				○				●	●			
	3QP-TPGW110304SF		2.2	3				○			●					
	3QP-TPGW110308LF	0.8	1.9	3			○				●					
	3QP-TPGW110308-LF		1.9	3			○					●	●			
	3QP-TPGW110308-L		1.9	3				○				●	●			
	3QP-TPGW110308SF		1.9	3				○			●					
Finishing	3QP-TPGW110302	0.2	2.3	3		○						●	●			●
	3QP-TPGW110302-LC		2.3	3					○			●	●			
	3QP-TPGW110304	0.4	2.2	3		○						●	●		●	●
	3QP-TPGW110304SR		2.2	3		○					●			●		
	3QP-TPGW110304LC		2.2	3					○		●					
	3QP-TPGW110304-LC		2.2	3					○			●	●			
	3QP-TPGW110308	0.8	1.9	3		○						●	●		●	●
	3QP-TPGW110308SR		1.9	3		○					●			●		
	3QP-TPGW110308LC		1.9	3					○		●					
	3QP-TPGW110308-LC		1.9	3					○			●	●			
Medium cutting	3QP-TPGW110302-H	0.2	2.3	3						○			●			
	3QP-TPGW110304-H	0.4	2.2	3						○			●			
	3QP-TPGW110304HC		2.2	3						○				●		
	3QP-TPGW110308-H	0.8	1.9	3						○			●			
	3QP-TPGW110308HC		1.9	3						○				●		

● : New product
● : Line up

TP with chipbreaker



IC : 6.35 mm
D1 : 3.4 mm
S : 3.18 mm

Triangular Positive 11° with hole

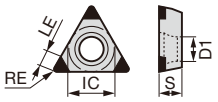
		BM05M	BXA10	BXA20	BR35F	BXM10
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●ᑕ	✣	●
	Sintered alloy					

Application	Designation	RE	LE	No. of corners	Wiper	First choice	Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10
Precision finishing	3QP-TPGT110302-HP	0.2	2.3	3		○							●		
	3QP-TPGT110304-HP	0.4	2.2	3		○					●	●	●	●	●
	3QP-TPGT110304-HS		2.1	3		○						●	●	●	
	3QP-TPGT110308-HP	0.8	1.9	3		○					●	●	●	●	●
	3QP-TPGT110308-HS		1.8	3		○						●	●	●	

● : New product
● : Line up

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

TP



IC : 7.94 mm
D1 : 3.4 mm
S : 3.18 mm

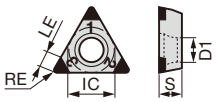
Triangular Positive 11° with hole

		BXA10	BXA20	BXM10	BXM20
K	Cast iron				
S	Superalloy				
H	Hard material	●	●◐	●	●◐
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	**3QP-TPGW130302**	0.2	2.3	3		○					●	●		●
Finishing	3QP-TPGW1303**04**	0.4	2.2	3		○					●	●	●	●
Finishing	3QP-TPGW1303**08**	0.8	1.9	3		○					●	●		

● : Line up

TP



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

Triangular Positive 11° with hole

		BXA10	BXA20	BXM10	BXM20
K	Cast iron				
S	Superalloy				
H	Hard material	●	●◐	●	●◐
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	**3QP-TPGW16T302**	0.2	2.3	3		○					●	●		
Finishing	3QP-TPGW16T3**04**	0.4	2.2	3		○					●	●	●	●
Finishing	3QP-TPGW16T3**08**	0.8	1.9	3		○					●	●	●	●

● : Line up

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

TP

IC : 9.525 mm
D1 : 4.4 mm
S : 4.76 mm

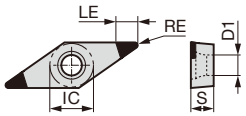
Triangular Positive 11° with hole

		BXA10	BXA20	BXM10	BXM20
K	Cast iron	●	●◐	●	●◐
S	Superalloy				
H	Hard material				
	Sintered alloy				

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10	BXM20
Finishing	**3QP-TPGW160402**	0.2	2.3	3		○					●	●		
	3QP-TPGW1604**04**	0.4	2.2	3		○					●	●	●	●
	3QP-TPGW1604**08**	0.8	1.9	3		○					●	●		●
Medium cutting	**3QP-TPGW160402-H**	0.2	2.3	3						○	●	●		
	3QP-TPGW1604**04-H**	0.4	2.2	3						○	●	●		
	3QP-TPGW1604**08-H**	0.8	1.9	3						○	●	●		

● : Line up

VB



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

35° Rhombic Positive 5° with hole

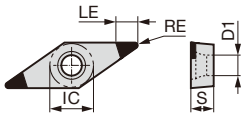
		BXA10	BXA20
K	Cast iron	●	●◐
S	Superalloy		
H	Hard material		
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	**2QP-VBGW110202**	0.2	3.5	2		○					●	●
	2QP-VBGW1102**04**	0.4	3.1	2		○					●	●
	2QP-VBGW1102**08**	0.8	2.2	2		○					●	●

● : Line up

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

VB



IC : 6.35 mm
D1 : 2.8 mm
S : 3.18 mm

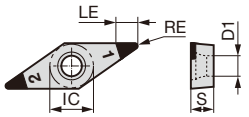
35° Rhombic Positive 5° with hole

		BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron	●	●◐	✣	●	●◐
S	Superalloy					
H	Hard material					
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-VBGW110302-LF	0.2	3.5	2			○				●	●			
	2QP-VBGW110302-L		3.5	2				○			●	●			
	2QP-VBGW110304-LF	0.4	3.1	2			○				●	●			
	2QP-VBGW110304-L		3.1	2				○			●	●			
	2QP-VBGW110308-LF	0.8	2.2	2			○				●	●			
	2QP-VBGW110308-L		2.2	2				○			●	●			
Finishing	2QP-VBGW110301	0.1	3.7	2		○					●	●			
	2QP-VBGW110302	0.2	3.5	2		○					●	●			
	2QP-VBGW110302-LC		3.5	2					○		●	●			
	2QP-VBGW110304	0.4	3.1	2		○					●	●		●	●
	2QP-VBGW110304SR		3.1	2		○							●		
	2QP-VBGW110304-LC		3.1	2					○		●	●			
	2QP-VBGW110308	0.8	2.2	2		○					●	●		●	●
	2QP-VBGW110308SR		2.2	2		○							●		
	2QP-VBGW110308-LC		2.2	2					○		●	●			

● : Line up

VB with chipbreaker



IC : 6.35 mm
D1 : 2.8 mm
S : 3.18 mm

35° Rhombic Positive 5° with hole

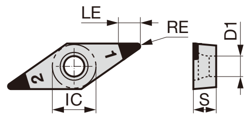
		BXA10	BXA20	BXM10
K	Cast iron			
S	Superalloy			
H	Hard material	●	●◐	●
	Sintered alloy			

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20	BXM10
Precision finishing	2QP-VBGT110302-HP	0.2	3.5	2		○						●	
	2QP-VBGT110304-HP	0.4	3	2		○					●	●	●
	2QP-VBGT110304-HS		3	2		○					●	●	
	2QP-VBGT110308-HP	0.8	2.2	2		○					●	●	●
	2QP-VBGT110308-HS		2.2	2		○					●	●	

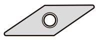
● : Line up

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

VB



IC : 9.525 mm
D1 : 4.4 mm
S : 4.76 mm



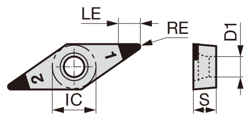
35° Rhombic Positive 5° with hole

		BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
K	Cast iron						
S	Superalloy						
H	Hard material	●	●	●◐	✠	●	●◐
	Sintered alloy						

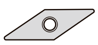
Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F	BXM10	BXM20
Precision finishing	2QP-VBGW160402-LF	0.2	3.5	2			○					●	●			
	2QP-VBGW160402-L		3.5	2				○				●	●			
	2QP-VBGW160404LF	0.4	3.1	2			○				● (new)					
	2QP-VBGW160404-LF		3.1	2			○					●	●			
	2QP-VBGW160404-L		3.1	2				○				●	●			
	2QP-VBGW160404SF		3.1	2				○			● (new)					
	2QP-VBGW160408LF	0.8	2.2	2			○				● (new)					
	2QP-VBGW160408-LF		2.2	2			○					●	●			
	2QP-VBGW160408-L		2.2	2				○				●	●			
	2QP-VBGW160408SF		2.2	2				○			● (new)					
Finishing	2QP-VBGW160402	0.2	3.5	2		○						●	●			
	2QP-VBGW160402-LC		3.5	2					○			●	●			
	2QP-VBGW160404	0.4	3.1	2		○						●	●		●	●
	2QP-VBGW160404SR		3.1	2		○					● (new)			●		
	2QP-VBGW160404LC		3.1	2					○		● (new)					
	2QP-VBGW160404-LC		3.1	2					○			●	●			
	2QP-VBGW160408	0.8	2.2	2		○						●	●		●	●
	2QP-VBGW160408SR		2.2	2		○					● (new)			●		
	2QP-VBGW160408LC		2.2	2					○		● (new)					
	2QP-VBGW160408-LC		2.2	2					○			●	●			
	2QP-VBGW160412	1.2	3	2		○						●	●			
Medium cutting	2QP-VBGW160402-H	0.2	3.5	2						○			●			
	2QP-VBGW160404-H	0.4	3.1	2						○			●			
	2QP-VBGW160404HC		3.1	2						○				●		
	2QP-VBGW160408-H	0.8	2.2	2						○			●			
	2QP-VBGW160408HC		2.2	2						○				●		

● (red) : New product
● : Line up

VB with chipbreaker



IC : 9.525 mm
D1 : 4.4 mm
S : 4.76 mm



35° Rhombic Positive 5° with hole

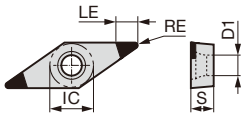
		BM05M	BXA10	BXA20	BXM10
K	Cast iron				
S	Superalloy				
H	Hard material	●	●	●◐	●
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BXM10
Precision finishing	2QP-VBGT160402-HP	0.2	3.5	2		○							●	
	2QP-VBGT160404-HP	0.4	3	2		○					● (new)	●	●	●
	2QP-VBGT160404-HS		3	2		○						●	●	
	2QP-VBGT160408-HP	0.8	2.2	2		○					● (new)	●	●	●
	2QP-VBGT160408-HS		2.2	2		○						●	●	

● (red) : New product
● : Line up

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

VC



IC : 4.76 mm
D1 : 2.3 mm
S : 2.38 mm

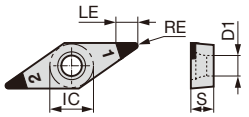
35° Rhombic Positive 7° with hole

		BXA10	BXA20
K	Cast iron	●	●ⓒ
S	Superalloy		
H	Hard material		
	Sintered alloy		

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BXA10	BXA20
Finishing	**2QP-VCGW080202**	0.2	3.5	2		○					●	●
	2QP-VCGW0802**04**	0.4	3.1	2		○					●	●
	2QP-VCGW0802**08**	0.8	2.2	2		○					●	●

● : Line up

VC



IC : 9.525 mm
D1 : 4.4 mm
S : 4.76 mm

35° Rhombic Positive 7° with hole

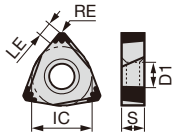
		BM05M	BXA10	BXA20	BXM10	BXM20
K	Cast iron					
S	Superalloy					
H	Hard material	●	●	●ⓒ	●	●ⓒ
	Sintered alloy					

Application	Designation	Dimension (mm) RE	Dimension (mm) LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BXM10	BXM20
Finishing	**2QP-VCGW160402**	0.2	3.5	2		○						●	●		
	2QP-VCGW1604**04**	0.4	3.1	2		○						●	●	●	●
	2QP-VCGW1604**04SR**		3.1	2		○					●				
	2QP-VCGW1604**08**	0.8	2.2	2		○						●	●		
	2QP-VCGW1604**08SR**		2.2	2		○					●				
Medium cutting	**2QP-VCGW160402-H**	0.2	3.5	2						○		●	●		
	2QP-VCGW1604**04-H**	0.4	3.1	2						○		●	●		
	2QP-VCGW1604**08-H**	0.8	2.2	2						○		●	●		

● : New product
● : Line up

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

WX



IC : 6.35 mm
D1 : 2.7 mm
S : 3.18 mm

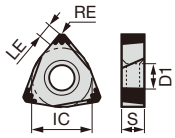
80° Trigon with hole

		BM05M	BXA10	BXA20	BR35F
K	Cast iron				
S	Superalloy				
H	Hard material	●	●	●ⓒ	✣
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F
Finishing	6QS-WXGQ040302SPR	0.2	1.8	6		○					●	●	●	●
	6QS-WXGQ040302SPL	0.2	1.8	6		○					●	●	●	●
	6QS-WXGQ040304SPR	0.4	1.8	6		○					●	●	●	●
	6QS-WXGQ040304SPL	0.4	1.8	6		○					●	●	●	●
	6QS-WXGQ040308SPR	0.8	1.7	6		○					●	●	●	●
	6QS-WXGQ040308SPL	0.8	1.7	6		○					●	●	●	●

● : New product
● : Line up

WX with chipbreaker



IC : 6.35 mm
D1 : 2.7 mm
S : 3.18 mm

80° Trigon with hole

		BM05M	BXA10	BXA20	BR35F
K	Cast iron				
S	Superalloy				
H	Hard material	●	●	●ⓒ	✣
	Sintered alloy				

Application	Designation	Dimension (mm) RE	LE	No. of corners	Wiper	First choice	Machining challenges: Burr	Flank wear	Crater wear	Chipping	BM05M	BXA10	BXA20	BR35F
Precision finishing	6QS-WXGU040304R-HP	0.4	1.8	6		○					●	●	●	●
	6QS-WXGU040304L-HP	0.4	1.8	6		○					●	●	●	●
	6QS-WXGU040308R-HP	0.8	1.7	6		○					●	●	●	●
	6QS-WXGU040308L-HP	0.8	1.7	6		○					●	●	●	●

● : New product
● : Line up

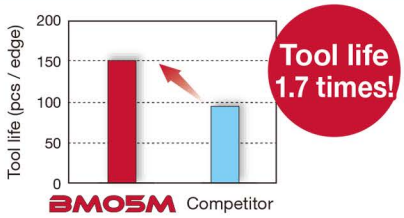
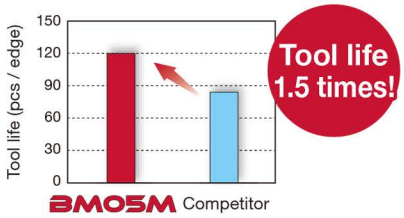
NEW PRODUCT NEWS

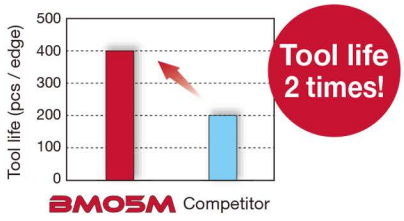
Tungaloy Report No. 551-G

mgt MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

PRACTICAL EXAMPLES

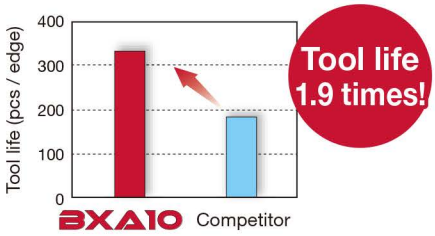
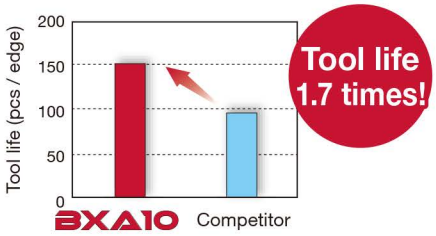
Workpiece type		New Automotive parts (Gear)	New Automotive parts (Gear)
Insert		2QP-CNGA120408SR	2QP-CNGA120404SR
Grade		**BM05M**	**BM05M**
Workpiece material		SCM420 / 18CrMo4 (55HRC)	SCM420 / 18CrMo4 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	250	250 (Competitor: 185)
	Feed : *f* (mm/rev)	0.13	0.12
	Depth of cut : *ap* (mm)	0.1	0.1
	Coolant	Wet	Air blast
Results		 **BM05M** provided excellent crater wear resistance during high speed machining, allowing 1.7x tool life increase over the competitor.	 **BM05M**, with excellent crater wear resistance, provided 1.5x tool life increase at a 1.4x cutting speed over the competitor.

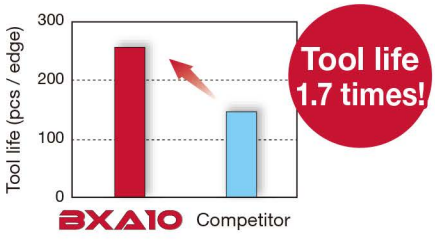
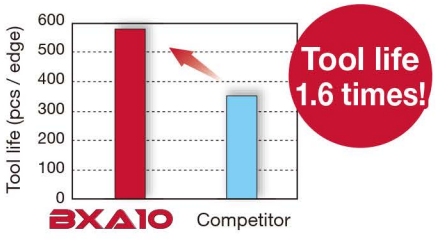
Workpiece type		New Automotive parts (Gear)	New Automotive parts (Gear)
Insert		4QS-CNGA120408FW	2QP-CNGA120408SF
Grade		**BM05M**	**BM05M**
Workpiece material		20MnCrS5 (61HRC)	16MnCr5 (58 - 60HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	260 (Competitor: 160)	240 (Competitor: 160)
	Feed : *f* (mm/rev)	0.26 (Competitor: 0.22)	0.08
	Depth of cut : *ap* (mm)	0.15	0.12
	Coolant	Dry	Wet
Results		 **BM05M**, combined with **FW** wiper, provided double tool life at increased feeds and speeds over the competitor CBN insert with wiper. Part surface quality was also improved.	 **BM05M**, with excellent crater wear resistance, provided 1.8x tool life at 1.5x the cutting speed of the competitor.

NEW PRODUCT NEWS

MEGA TECH METALWORK

Tungaloy Report No. 551-G

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)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	100	130
	Feed : *f* (mm/rev)	0.05	0.1
	Depth of cut : *ap* (mm)	0.15	0.15
	Coolant	Dry	Wet
Results		 Flank wear resistant **BXA10** grade provided a 190% increase in tool life over the competitor's.	 Good coating layer adhesion of **BXA10** ensured edge toughness during machining, provided high and stable quality surface finishing.

Workpiece type		Automotive parts (Stator)	Automotive parts (Ring)
Insert		2QP-DCGW11T308	2QP-CCGW09T308-L
Grade		**BXA10**	**BXA10**
Workpiece material		SCM420 / 18CrMo4 (62HRC)	16MnCr5 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	168	180
	Feed : *f* (mm/rev)	0.08	0.1 - 0.15
	Depth of cut : *ap* (mm)	0.2 x 2 passes	0.1
	Coolant	Wet	Dry
Results		 Crater wear resistant **BXA10** has prevented catastrophic insert failure, providing 170% increase in tool life.	 **BXA10** in combination with the -L edge prep has enhanced the insert's cutting edge toughness, prolonging tool life by 160%.

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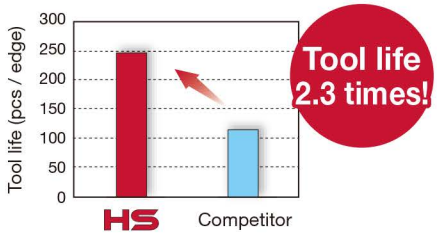
TUNGALOY ADDFORCE ACCELERATED LINES

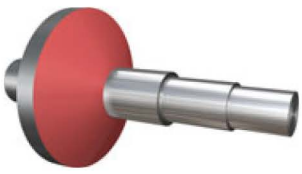
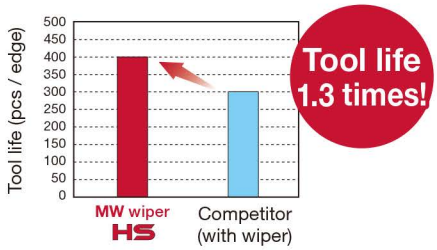
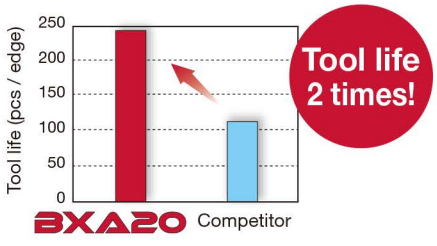
NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

Workpiece type		Automotive parts (Input shaft)	Ring gear
Insert		2QP-CNGM120408-**HS**	4QS-CNGA120408FW
Grade		**BXA10**	**BXA10**
Workpiece material		SCM420 / 18CrMo4 (58 - 60HRC)	SCM420 /18CrMo4 (55HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	113 - 238	100
	Feed : *f* (mm/rev)	0.17	0.1
	Depth of cut : *ap* (mm)	0.25	0.2
	Coolant	Wet	Wet
Results		 1 out of 10 parts that were machined with the competitor's CBN chipbreaker resulted in chip birdnesting. **BXA10** grade insert with **HS** chipbreaker eliminated chip birdnesting and, thanks to its good wear resistance, provided 230% tool life increase.	 The combination of wear-resistant **BXA10** grade and **FW** wiper provided 3 times tool life increase over the competitor.

Workpiece type		Counter-driven gear	Automotive parts (CVT)
Insert		2QP-CNGM120408MW-**HS**	2QP-DNGA150412
Grade		**BXA10**	**BXA20**
Workpiece material		SCr420 / 20Cr4 (60HRC)	SCr420 / 20Cr4 (59HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	120	170
	Feed : *f* (mm/rev)	0.3	0.3
	Depth of cut : *ap* (mm)	0.15	0.1
	Coolant	Wet	Wet
Results		 Wear-resistant **BXA10** grade insert provided 1.3 times tool life increase. While **HS** chipbreaker promoted smooth chip control.	 Tool life is doubled due to higher wear resistance.

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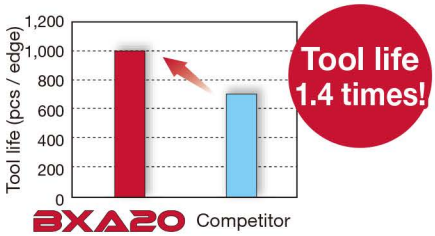
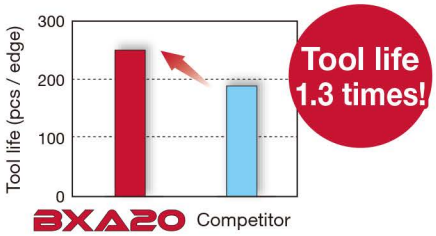
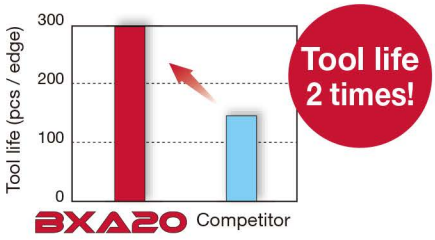
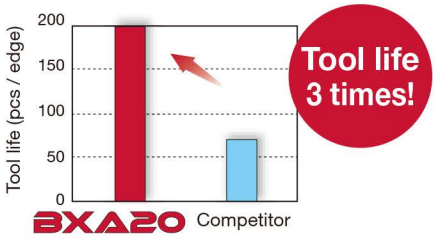
TUNGALOY ADDFORCE ACCELERATED LINES

NEW PRODUCT NEWS

mgt MEGA TECH METALWORK

Tungaloy Report No. 551-G

Workpiece type		Automotive parts (CVJ)	Automotive parts (Gear)
Insert		2QP-DNGA150420	2QP-**GNGA**120408
Grade		**BXA20**	**BXA20**
Workpiece material		SCr420 / 20Cr4 (60HRC)	SCr420 / 20Cr4 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	150	120
	Feed : *f* (mm/rev)	0.25	0.1
	Depth of cut : *ap* (mm)	0.2	0.1
	Coolant	Wet	Wet
Results			
		The operation is stable with **BXA20** even in interrupted machining.	Due to thin-walled parts, the competitor's insert generated vibration as edge wear progressed, eventually created scrapped parts. With 70° nose angle, **GNGA** insert generated reduced radial cutting force, prolonging tool life by 130%.

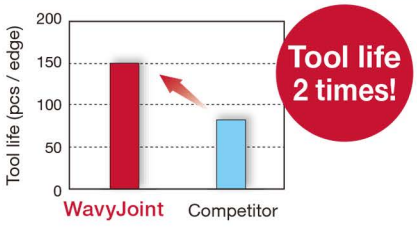
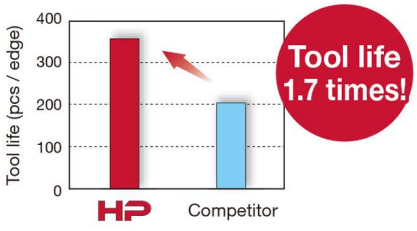
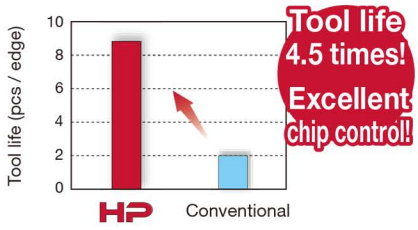
Workpiece type		Automotive parts (Input shaft)	Automotive parts (Input shaft)
Insert		2QP-CCGW060204	3QP-TPGW110308
Grade		**BXA20**	**BXA20**
Workpiece material		SCr420 / 20Cr4 (63HRC)	SNCM420 (58HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	120	170
	Feed : *f* (mm/rev)	0.1	0.08
	Depth of cut : *ap* (mm)	0.1	0.1
	Coolant	Wet	Wet
Results			
		Chipping-resistant grade, **BXA20** provided process security, achieving double tool life over the competitor.	**BXA20** offered good edge line security, achieving triple tool life over the competitor without compromising surface quality.

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

	Workpiece type	**Automotive parts (Transmission shaft)**	**Heavy industries (Movable arm shaft)**
	Insert	4QS-CNGA120412	4QS-CNGA120408-H
	Grade	**BXA20**	**BXA20**
	Workpiece material	SCM420 / 18CrMo4 (60HRC)	S45C / C45 (50HRC)
			
Cutting conditions	**Cutting speed: *Vc* (m/min)**	100	180
	Feed : *f* (mm/rev)	0.1 - 0.2	0.1
	Depth of cut : *ap* (mm)	0.7 - 1	0.5
	Coolant	Dry	Dry
	Results		
		The **WavyJoint** technology insert successfully machined 150 pcs/corner, almost twice that of the competitor's, without CBN tip failure.	Thanks to its capability for aggressive D.O.C., the **WavyJoint** insert completed the process in a single pass, whereas the competitor's insert required two passes. In addition, it achieved double the tool life without edge fracture, despite the high cutting load imposed.
	Workpiece type	**Automotive parts (Bevel gear)**	**Sleeve (for industrial machinery)**
	Insert	2QP-CNGM120408-**HP**	6QS-TNGG160402-**HP**
	Grade	**BXA20**	**BXA20**
	Workpiece material	SCM420 / 18CrMo4 (58HRC)	SKH40 / HS6-5-3-8
			
Cutting conditions	**Cutting speed: *Vc* (m/min)**	160	40
	Feed : *f* (mm/rev)	0.1	0.03
	Depth of cut : *ap* (mm)	0.15	0.05
	Coolant	Wet	Dry
	Results		
		The competitor's CBN insert had a short tool life because of chip re-cutting. **HP** chipbreaker insert eliminated chip birdnesting, while also providing long tool life and excellent surface finish quality.	**BXA20** insert with **HP** chipbreaker allowed excellent chip control and provided 4.5x tool life increase over the competitor's uncoated CBN insert.

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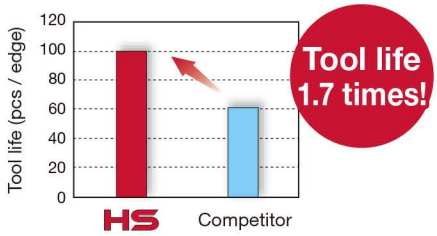
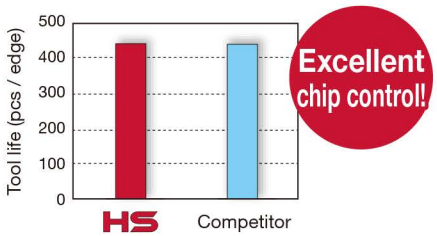
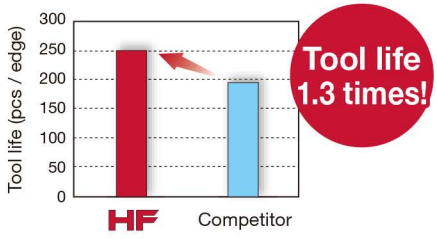
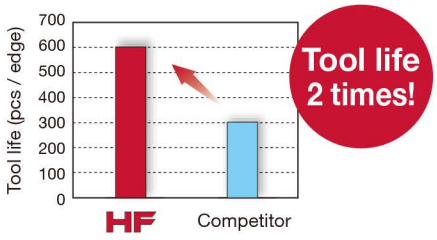
TUNGALOY ADDFORCE ACCELERATED LINES

NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

Workpiece type		Heavy equipment (Road roller)	Automotive parts
Insert		3QP-TNGM160408-**HS**	2QP-CCGT060204-**HS**
Grade		**BXA20**	**BXA20**
Workpiece material		S45C / C45 (58HRC)	SCM420 / 18CrMo4 (58HRC)
			
Cutting conditions	Cutting speed: *Vc* (m/min)	180	130
	Feed : *f* (mm/rev)	0.15	0.25
	Depth of cut : *ap* (mm)	0.25	0.2
	Coolant	Wet	Wet
Results			
		HS chipbreaker provided good chip control and eliminated chip re-cutting, improving surface quality.	Out of 100 parts, 1 - 2 that were machined with the competitor's CBN chipbreaker insert resulted in chip birdnesting. **BXA20** with **HS** chipbreaker eliminated chip birdnesting.

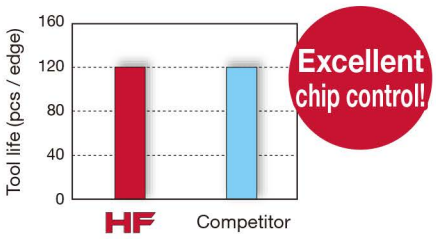
Workpiece type		Automotive part	Automotive part (shaft)
Insert		2QP-CNGM120408-**HF**	4QS-CNGG120408-**HF**
Grade		**BXA20**	**BXA20**
Workpiece material		SCr420 / 20Cr4 (40 - 55HRC)	SCr420 / 20Cr4 (40 - 55HRC)
			
Cutting conditions	Cutting speed: *Vc* (m/min)	130	140
	Feed : *f* (mm/rev)	0.24	0.22
	Depth of cut : *ap* (mm)	0.5 x 2 passes	0.3 x 3 passes
	Coolant	Wet	Wet
Results			
		HF chipbreaker reduced crater wear, while providing 1.3 times tool life increase.	The competitor's insert could not control chips from the beginning and ended up with short tool life. **HF** chipbreaker provided reliable chip forming and double tool life.

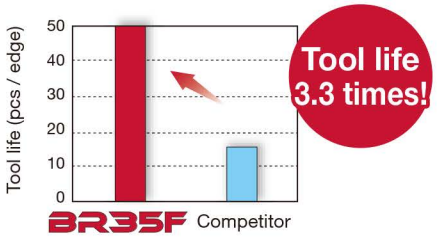
NEW PRODUCT NEWS

Tungaloy Report No. 551-G

MEGA TECH METALWORK

BM05M/BXA10/BXA20/BR35F

Workpiece type		Automotive parts (shaft)	Automotive parts (Gear)
Insert		2QP-CNGM120408-**HF**	2QP-CNGA120412HC
Grade		**BXA20**	**BR35F**
Workpiece material		SCM420 / 18CrMo4 (40 - 54HRC)	SCM420 / 18CrMo4 (60HRC)
			
Cutting conditions	Cutting speed: *Vc* (m/min)	160 - 180	70
	Feed : *f* (mm/rev)	0.2	0.05
	Depth of cut : *ap* (mm)	0.4 - 0.5 x 3 passes	0.15
	Coolant	Wet	Dry
Results		 Birdnesting occurred when using the competitor's CBN with chipbreaker. **HF** chipbreaker has eliminated birdnesting.	 **BR35F** offered excellent chipping resistance, providing 130% longer tool life over the competitor.

Workpiece type		Automotive parts (Bevel gear)	Automotive parts (Ring gear shaft)
Insert		2QP-CNGA120408HC	2QP-DNGA150408HC
Grade		**BR35F**	**BR35F**
Workpiece material		SCM420 / 18CrMo4 (58HRC)	SCr420 / 20Cr4 (60HRC)
			
Cutting conditions	Cutting speed: *Vc* (m/min)	120	80
	Feed : *f* (mm/rev)	0.12	0.06 - 0.08
	Depth of cut : *ap* (mm)	0.1 - 0.3	0.15
	Coolant	Dry	Dry
Results		 **BR35F** provided 130% longer tool life over the competitor with no edge chipping.	 The competitor's insert demonstrated repeated catastrophic failures, providing insecure process. **BR35F** provided 330% longer tool life with no edge fracture.

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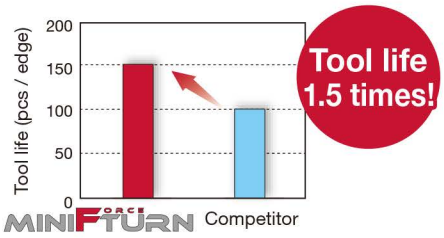
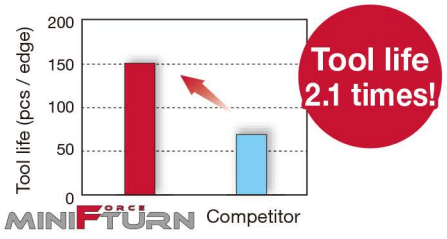
NEW PRODUCT NEWS

mgt MEGA TECH METALWORK

Tungaloy Report No. 551-G

Workpiece type		Automotive parts (Cam shaft)	Gear parts
Insert		2QP-CNGA120404HC	6QS-WXGQ040304SPL
Grade		**BR35F**	**BXA10**
Workpiece material		SCM420 / 18CrMo4 (60HRC)	SCM420 / 18CrMo4 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	110	70
	Feed : *f* (mm/rev)	0.06	0.03
	Depth of cut : *ap* (mm)	0.12	0.1
	Coolant	Dry	Dry
Results		 Extremely wear resistant, **BR35F** provided 290% longer tool life over the competitor.	 **MiniForce-Turn** insert provided 150% longer tool life than the competitor's positive insert, while also eliminating chatter during machining.

Workpiece type		Machine parts	Driven gear
Insert		6QS-WXGQ040304SPL	4QS-DXGQ070304SPL
Grade		**BXA20**	**BXA10**
Workpiece material		SCM415 (60HRC)	SCM420 / 18CrMo4 (50HRC)
		 H	 H
Cutting conditions	Cutting speed: *Vc* (m/min)	90	260
	Feed : *f* (mm/rev)	0.06	0.06
	Depth of cut : *ap* (mm)	0.075	0.15
	Coolant	Dry	Wet
Results		 Strong cutting edge design of **MiniForce-Turn** insert provided fracture resistance, prolonging tool life by 210% times over the competitor's positive insert.	 **MiniForce-Turn** provided better cutting edge integrity and more rigid insert clamping, compared with ISO positive inserts, achieving 2.1 times tool life increase.

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MEGA TECH METALWORK

CONTACT

Tel : 02-943-1591
Line ID : @mgt_metalwork
Email : sales.m@mgtg.co.th
Web : http://www.mgtg.co.th/

17/4 Soi Ramintra 89
Ramintra Khannayao
Bangkok 10230

SCAN QR CODE

For more information