

TurnLine



BXA30/BXA40

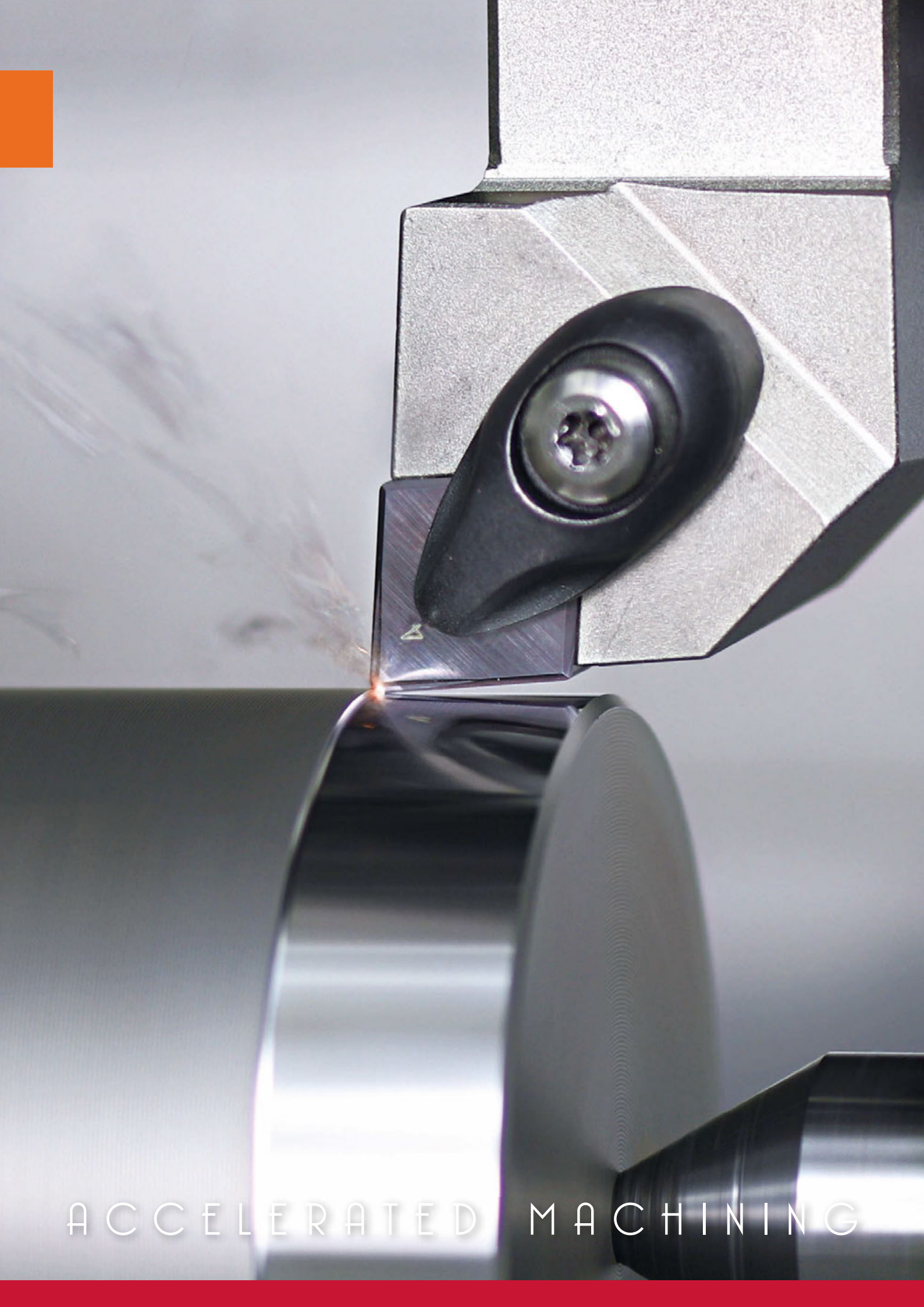
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Tungaloy Report No. 536-US

Coated CBN grades for precision finishing of hardened steel



INDUSTRY 4.0
FEED the SPEED!

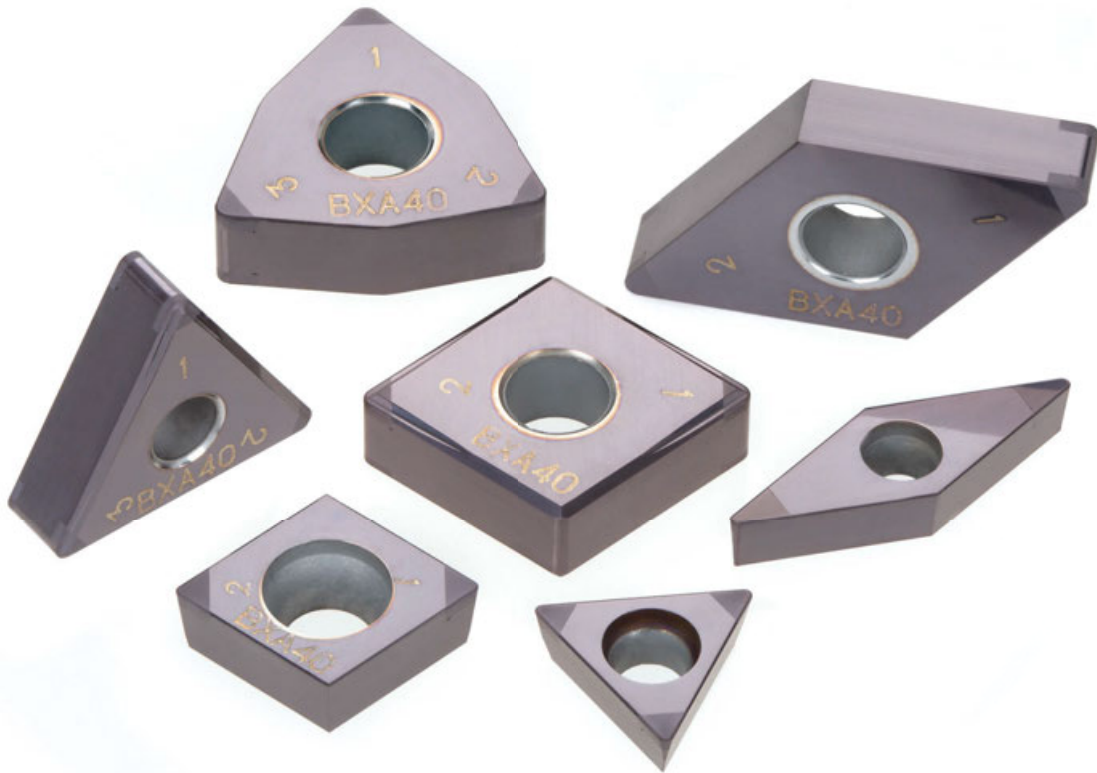


ACCELERATED MACHINING

TurnLine

BXA30/BXA40

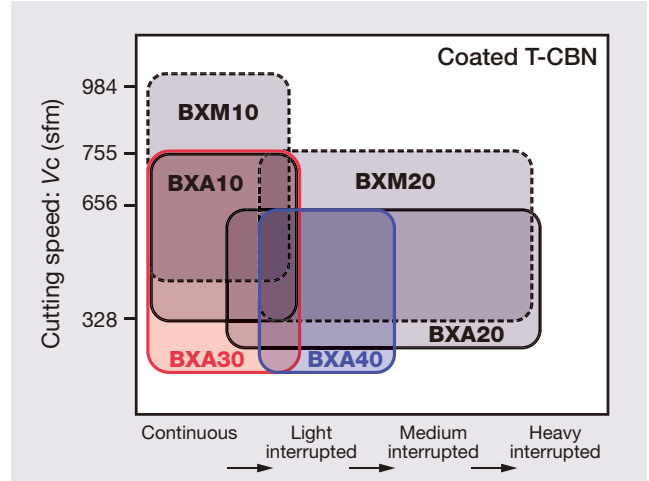
TUNGALOY



Provides a high quality surface on hardened steel parts, when using **extremely light depths of cut**

Thin PVD coating with superior adhesion to substrate

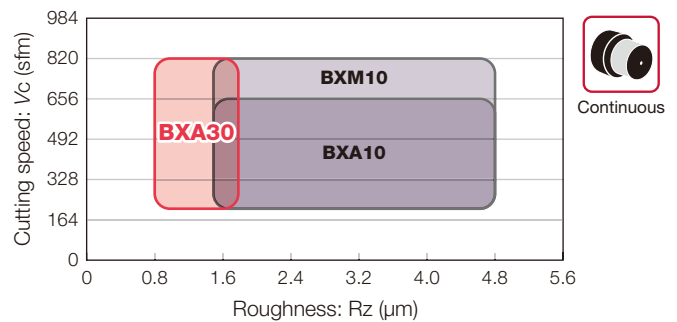
- Prevents premature insert fracture and provides machining security
- Provides good surface finish



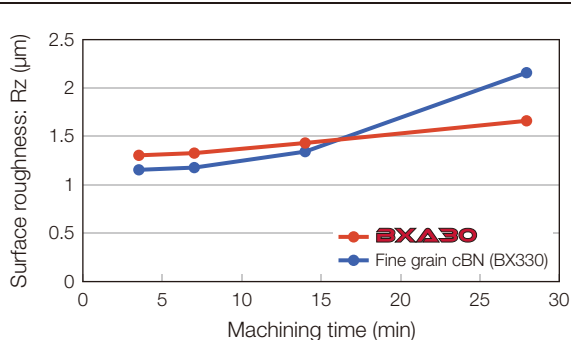
BXA30

Coated CBN grade for high quality surface finishing

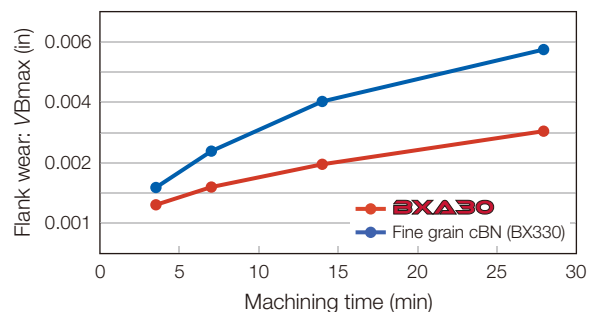
Ultra-fine cBN grain uniquely designed for superior adhesion with the PVD coating provides exceptional wear resistance and eliminates built-up edge, delivering excellent surface quality and tool life predictability.





Surface roughness



Wear resistance

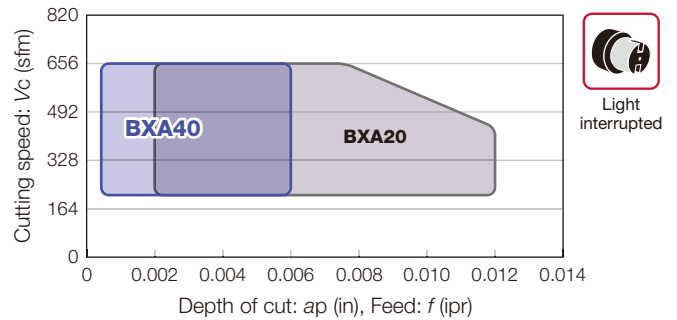


 Insert : 2QP-CNGA 432
 Workpiece material : 4140 (58HRC)
 Cutting speed : Vc = 656 sfm
 Feed : f = 0.003 ipr
 Depth of cut : ap = 0.006"
 Coolant : Wet

BXA40

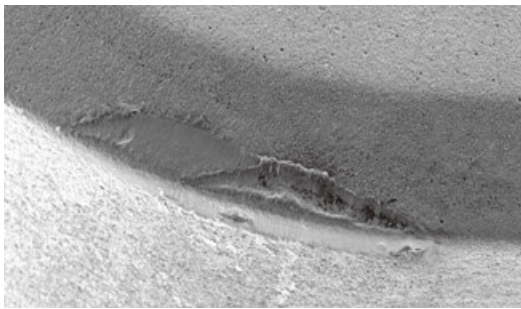
Coated CBN grade ideal of extremely light D.O.C.

Thanks to the cBN substrate being formulated for superior adhesion with the coating, edge chipping is significantly reduced for extended tool life during interrupted cuts using extremely light depths of cut and low feed rates.

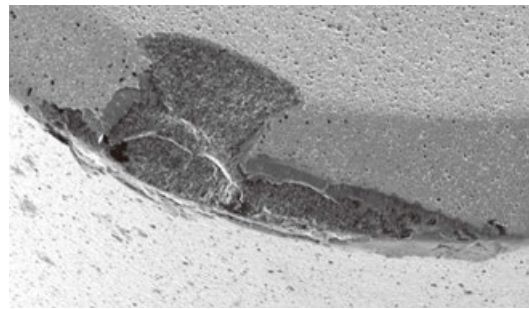


Small depth of cutting

Depth of cut $a_p = 0.001''$, Machining time 20 min



BXA40



Coated CBN (BXA20)

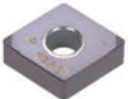
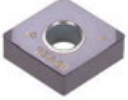
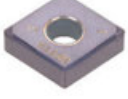
H Insert : 2QP-CNGA 432
 Workpiece material : 4140 (58HRC)
 Cutting speed : $V_c = 656$ sfm
 Feed : $f = 0.003$ ipr
 Depth of cut : $a_p = 0.001''$
 Coolant : Wet

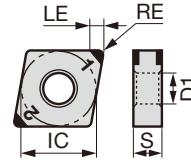
STANDARD CUTTING CONDITIONS




ISO	Grade	Workpiece condition	Cutting speed V_c (sfm)	Depth of cut a_p (in)	Feed f (ipr)
H	BXA30	Continuous	525 (164 - 755)	0.004 (0.001 - 0.006)	0.004 (0.001 - 0.006)
	BXA40	Light interrupted	459 (164 - 656)	0.004 (0.02 - 0.016)	0.006 (0.001 - 0.010)

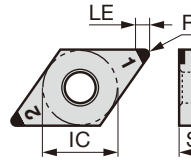
CBN INSERTS NEGATIVE TYPE

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

		P	M	K	N	S	H																
		Steel	Stainless	Cast iron	Non-ferrous	Superalloy	Hard material	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Shape	Designation	Dimension (in)		Edge prep.							Wiper Chipbreaker												
		Inch	Metric	No. of corners	LE	RE	IC	S	D1	Standard Sharp edge		L	LFLC	H									
		BXA30	BXA40																				
	4QP-CNGA 4QP-CNGA 431 4QP-CNGA120404	●	●	4	0.091	0.016	0.500	0.187	0.203	○													
	4QP-CNGA 432 4QP-CNGA120408	●	●	4	0.087	0.031	0.500	0.187	0.203	○													
	4QP-CNGA 433 4QP-CNGA120412	●	●	4	0.094	0.047	0.500	0.187	0.203	○													
	4QP-CNGA**H 4QP-CNGA 431-H 4QP-CNGA120404-H	●		4	0.091	0.016	0.500	0.187	0.203											○			
	4QP-CNGA 432-H 4QP-CNGA120408-H	●		4	0.087	0.031	0.500	0.187	0.203												○		
	4QP-CNGA 433-H 4QP-CNGA120412-H	●		4	0.094	0.047	0.500	0.187	0.203												○		
	4QP-CNGG**H* 4QP-CNGG 432-HF 4QP-CNGG120408-HF	●		4	0.087	0.031	0.500	0.187	0.203													○	
	4QP-CNGG 433-HF 4QP-CNGG120412-HF	●		4	0.094	0.047	0.500	0.187	0.203													○	
	4QP-CNGG 432-HM 4QP-CNGG120408-HM	●		4	0.087	0.031	0.500	0.187	0.203													○	
	4QP-CNGG 433-HM 4QP-CNGG120412-HM	●		4	0.094	0.047	0.500	0.187	0.203													○	



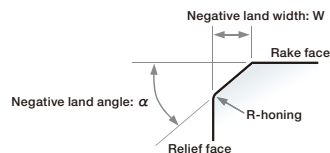
		P	M	K	N	S	H															
		Steel	Stainless	Cast iron	Non-ferrous	Superalloy	Hard material	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Shape	Designation	Dimension (in)		Edge prep.							Wiper Chipbreaker											
		Inch	Metric	No. of corners	LE	RE	IC	S	D1	Standard Sharp edge		L	LFLC	H								
		BXA30	BXA40																			
	4QP-DNGA 4QP-DNGA 431 4QP-DNGA150404	●	●	4	0.098	0.016	0.500	0.187	0.203	○												
	4QP-DNGA 432 4QP-DNGA150408	●	●	4	0.083	0.031	0.500	0.187	0.203	○												
	4QP-DNGA 433 4QP-DNGA150412	●	●	4	0.079	0.047	0.500	0.187	0.203	○												
	4QP-DNGA**H 4QP-DNGA 431-H 4QP-DNGA150404-H	●		4	0.098	0.016	0.500	0.187	0.203												○	
	4QP-DNGA 432-H 4QP-DNGA150408-H	●		4	0.083	0.031	0.500	0.187	0.203													○
	4QP-DNGA 433-H 4QP-DNGA150412-H	●		4	0.079	0.047	0.500	0.187	0.203													○
	4QP-DNGG**H* 4QP-DNGG 432-HF 4QP-DNGG150408-HF	●		4	0.083	0.031	0.500	0.187	0.203													○
	4QP-DNGG 433-HF 4QP-DNGG150412-HF	●		4	0.079	0.047	0.500	0.187	0.203													○
	4QP-DNGG 432-HM 4QP-DNGG150408-HM	●		4	0.083	0.031	0.500	0.187	0.203													○
	4QP-DNGG 433-HM 4QP-DNGG150412-HM	●		4	0.079	0.047	0.500	0.187	0.203													○



● : Line up

Edge preparation specification

	BXA30	BXA40
Standard	S01325	S01325
-H	S01335	S01335

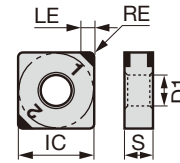




S	0	1	3	2	5
Edge prep. ID	Negative land width W		Negative land angle α		
T ... Chamfered					
S ... Chamfered + R-honing					
E ... R-honing alone					
F ... Sharp edge					

CBN INSERTS NEGATIVE TYPE

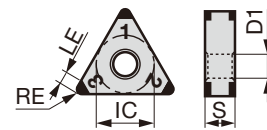
- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting




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



Shape	Designation		BXA40	No. of corners	Dimension (in)					Edge prep.					Wiper	Chipbreaker		
	Inch	Metric			LE	RE	IC	S	D1	Standard	L	LFLC	H					
					Sharp edge													
	4QP-SNGA	4QP-SNGA 431	4QP-SNGA120404	●	4	0.094	0.016	0.500	0.187	0.203	○							
		4QP-SNGA 432	4QP-SNGA120408	●	4	0.094	0.031	0.500	0.187	0.203	○							
		4QP-SNGA 433	4QP-SNGA120412	●	4	0.094	0.047	0.500	0.187	0.203	○							
	4QP-SNGA**-H	4QP-SNGA 432-H	4QP-SNGA120408-H	●	4	0.094	0.031	0.500	0.187	0.203								○
		4QP-SNGA 433-H	4QP-SNGA120412-H	●	4	0.094	0.047	0.500	0.187	0.203								○

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



Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.					Wiper	Chipbreaker		
	Inch	Metric				LE	RE	IC	S	D1	Standard	L	LFLC	H					
						Sharp edge													
	6QP-TNGA	6QP-TNGA 331	6QP-TNGA160404	● ●	6	0.087	0.016	0.375	0.187	0.150	○								
		6QP-TNGA 332	6QP-TNGA160408	● ●	6	0.075	0.031	0.375	0.187	0.150	○								
		6QP-TNGA 333	6QP-TNGA160412	● ●	6	0.094	0.047	0.375	0.187	0.150	○								
	6QP-TNGA**-H	6QP-TNGA 331-H	6QP-TNGA160404-H	●	6	0.087	0.016	0.375	0.187	0.150								○	
		6QP-TNGA 332-H	6QP-TNGA160408-H	●	6	0.075	0.031	0.375	0.187	0.150								○	
		6QP-TNGA 333-H	6QP-TNGA160412-H	●	6	0.094	0.047	0.375	0.187	0.150								○	
	6QP-TNGG**-H*	6QP-TNGG 332-HF	6QP-TNGG160408-HF	●	6	0.075	0.0316	0.375	0.187	0.150								○	
		6QP-TNGG 333-HF	6QP-TNGG160412-HF	●	6	0.094	0.047	0.375	0.187	0.150								○	
		6QP-TNGG 332-HM	6QP-TNGG160408-HM	●	6	0.075	0.031	0.375	0.187	0.150								○	
		6QP-TNGG 333-HM	6QP-TNGG160412-HM	●	6	0.094	0.047	0.375	0.187	0.150								○	

● : Line up

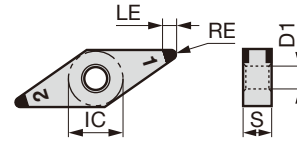
BXA30 / BXA40

TUNGALOY

CBN INSERTS NEGATIVE TYPE

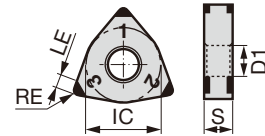
- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

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



Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.					Wiper	Chipbreaker		
						LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H				
																		Inch	Metric
	4QP-VNGA	4QP-VNGA 331	4QP-VNGA160404	●	●	4	0.122	0.016	0.375	0.187	0.150	○							
		4QP-VNGA 332	4QP-VNGA160408	●	●	4	0.087	0.031	0.375	0.187	0.150	○							
		4QP-VNGA 333	4QP-VNGA160412	●	●	4	0.118	0.047	0.375	0.187	0.150	○							
	4QP-VNGA**H	4QP-VNGA 331-H	4QP-VNGA160404-H	●		4	0.122	0.016	0.375	0.187	0.150								○
		4QP-VNGA 332-H	4QP-VNGA160408-H	●		4	0.087	0.031	0.375	0.187	0.150								○
	4QP-VNGG**HF	4QP-VNGG 332-HF	4QP-VNGG160408-HF	●		4	0.087	0.031	0.375	0.187	0.150								○
		4QP-VNGG 332-HM	4QP-VNGG160408-HM	●		4	0.087	0.031	0.375	0.187	0.150								○

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




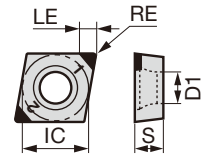
Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.					Wiper	Chipbreaker		
						LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H				
																		Inch	Metric
	6QP-WNGA	6QP-WNGA 432	6QP-WNGA080408	●		6	0.087	0.031	0.500	0.187	0.203	○							

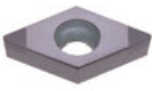
● : Line up

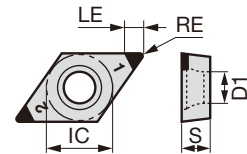
CBN INSERTS POSITIVE TYPE

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

Shape	Designation		BXA30	BXA40	●	●●	●●●	Dimension (in)					Edge prep.							
	Inch	Metric						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker
	2QP-CCGW	2QP-CCGW 21.50.5	2QP-CCGW060202	●	●			2	0.091	0.008	0.250	0.094	0.110	○						
		2QP-CCGW 21.51	2QP-CCGW060204	●	●			2	0.091	0.016	0.250	0.094	0.110	○						
		2QP-CCGW 32.51	2QP-CCGW09T304	●	●			2	0.091	0.016	0.375	0.156	0.173	○						
		2QP-CCGW 32.52	2QP-CCGW09T308	●	●			2	0.087	0.031	0.375	0.156	0.173	○						



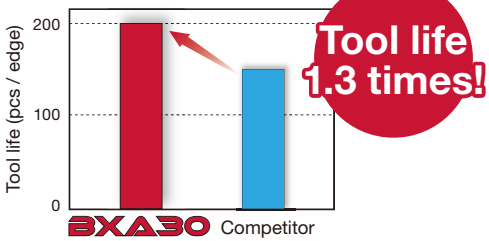
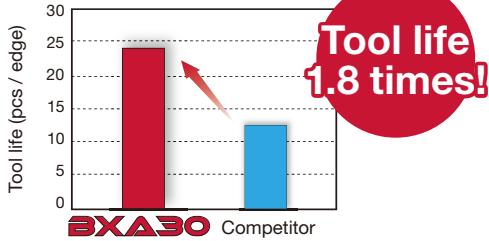

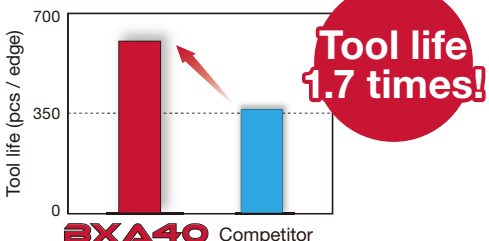


Shape	Designation		BXA30	BXA40	●	●●	●●●	Dimension (in)					Edge prep.							
	Inch	Metric						No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker
	2QP-DCGW	2QP-DCGW 21.50	2QP-DCGW070202	●	●			2	0.106	0.008	0.250	0.094	0.110	○						
		2QP-DCGW 21.51	2QP-DCGW070204	●	●			2	0.098	0.016	0.250	0.094	0.110	○						
		2QP-DCGW 32.50.5	2QP-DCGW11T302	●	●			2	0.106	0.008	0.375	0.156	0.173	○						
		2QP-DCGW 32.51	2QP-DCGW11T304	●	●			2	0.098	0.016	0.375	0.156	0.173	○						
		2QP-DCGW 32.52	2QP-DCGW11T308	●	●			2	0.083	0.031	0.375	0.156	0.173	○						



● : Line up

PRACTICAL EXAMPLES

Workpiece type		Machine parts (Ring)	Bearing parts
Insert		2QP-DCGW 32.51	2QP-DCGW 32.51
Grade		BXA30	BXA30
Workpiece material		SCM435H / 34CrMo4 (63HRC)	SUJ2 / B1 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: V_c (sfm)	656	548
	Feed : f (ipr)	0.002	0.001
	Depth of cut : a_p (in)	0.003	0.002
	Coolant	Wet	Wet
Results		 <p>With a requirement to maintain surface roughness of $R_z = 2.4$ or better, BXA30 has provided 130% increase in tool life over the competitors' grade.</p>	 <p>BXA30 has maintained the required surface quality even after the coating on the cutting point peeled off, providing 180% increase in tool life.</p>
Workpiece type		Sleeve	
Insert		3QP-TPGW 221	
Grade		BXA40	
Workpiece material		SCM415H (58HRC)	
		 H	
Cutting conditions	Cutting speed: V_c (sfm)	394	
	Feed : f (ipr)	0.004	
	Depth of cut : a_p (in)	0.001 - 0.002	
	Coolant	Wet	
Results		 <p>When machining a shaft with interrupted cuts at a light depth of cut, BXA40 has increased tool life by 170% over the competitor's insert.</p>	

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