

TurnLine

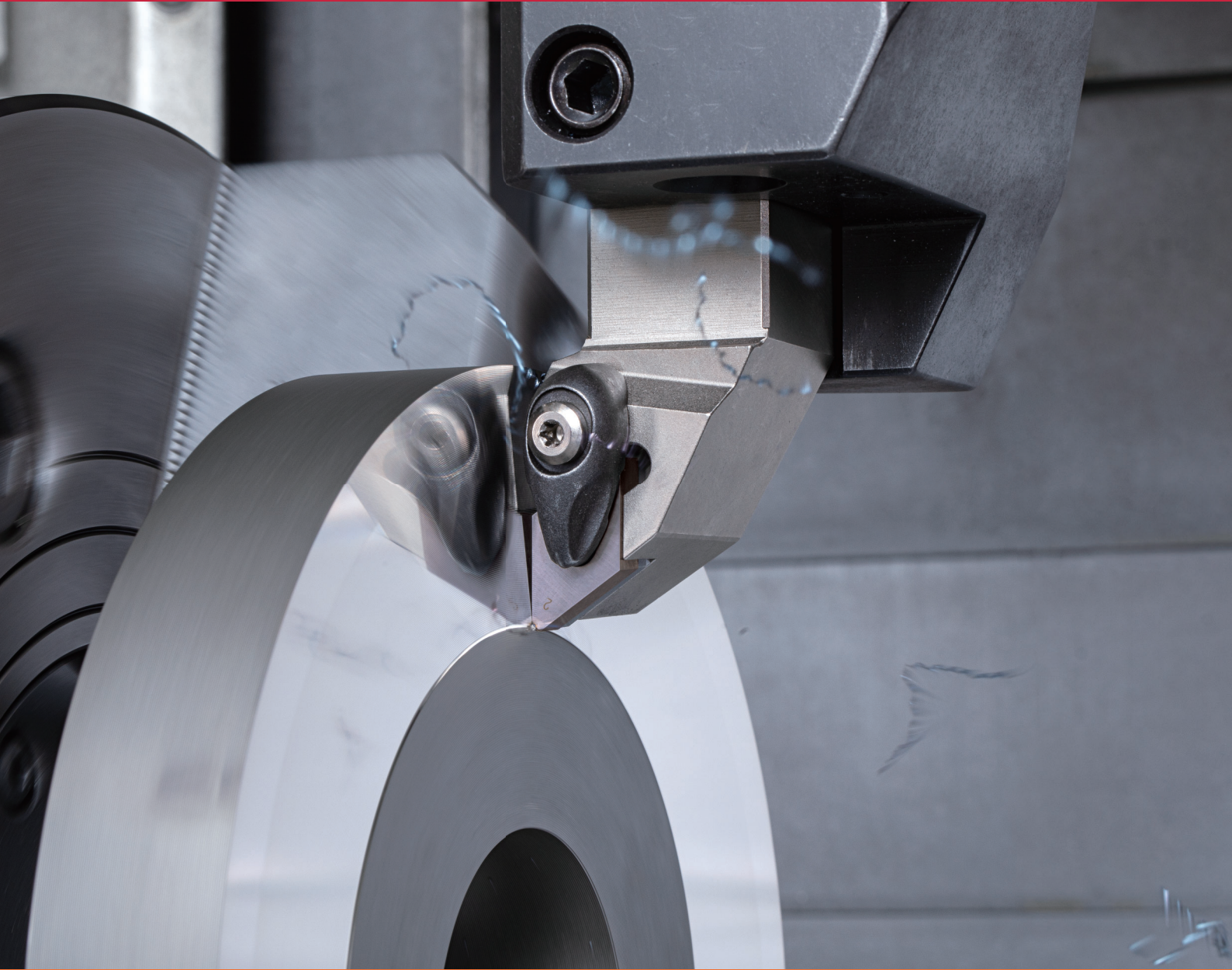


BXA30/BXA40

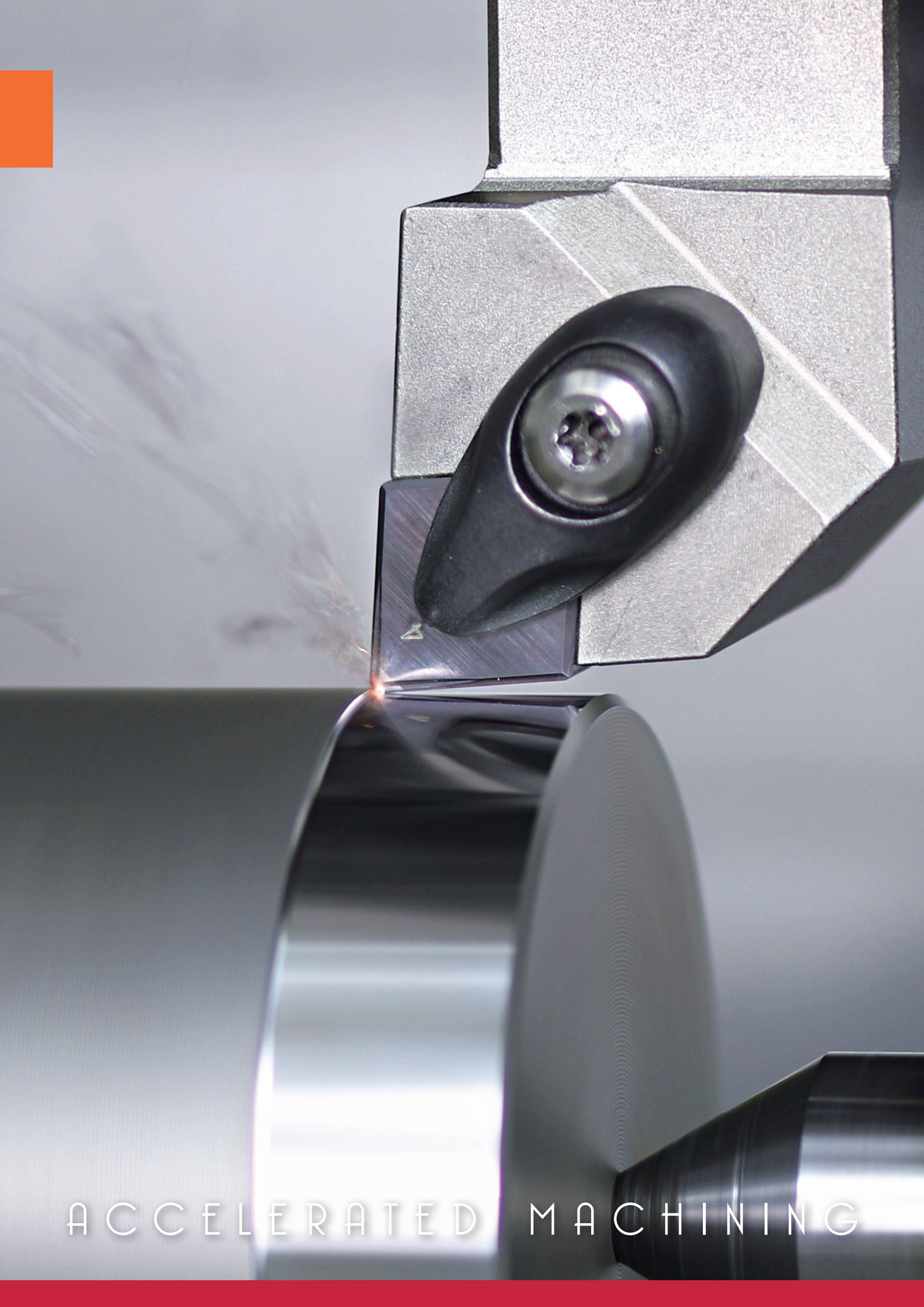
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Tungaloy Report No. 536-US

Coated CBN grades for precision finishing of hardened steel



INDUSTRY 4.0
FEED the SPEED!



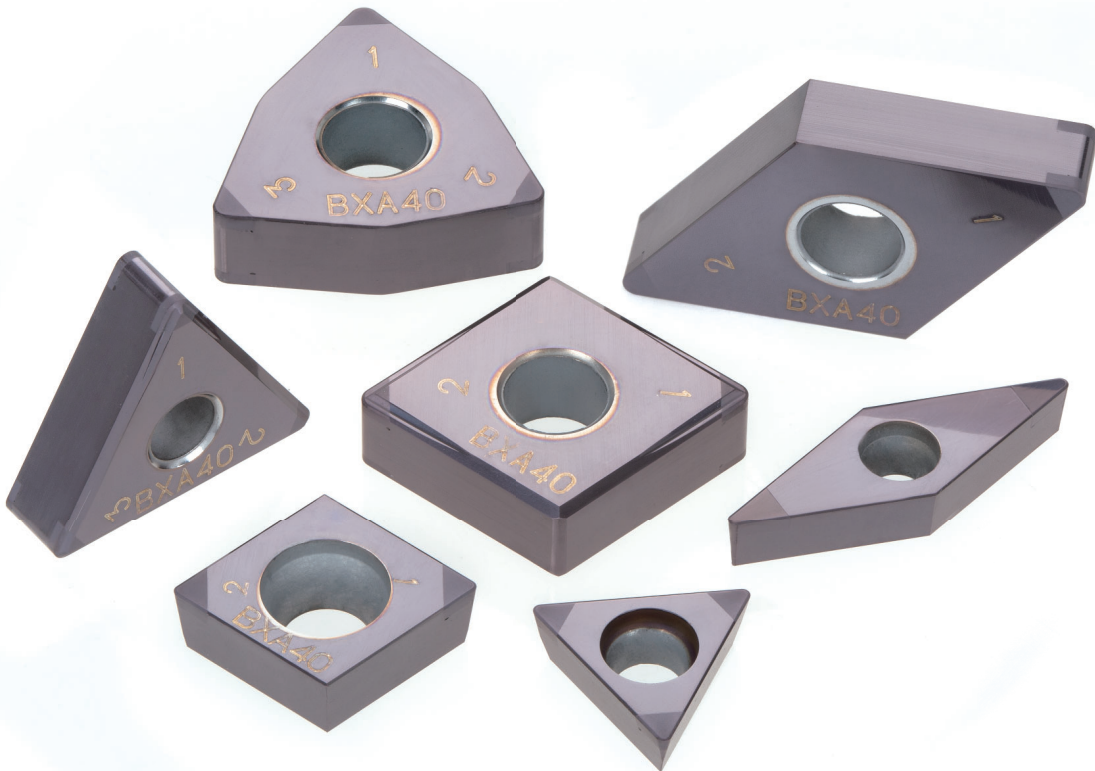
ACCELERATED MACHINING



TurnLine

BXA30/BXA40

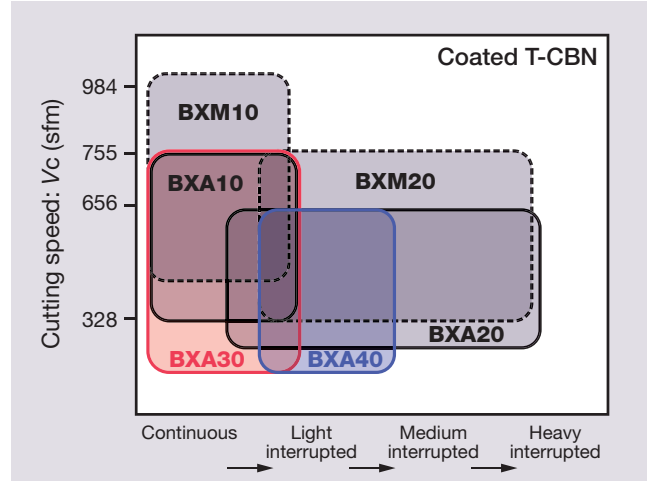
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Provides a high quality surface on hardened steel parts, when using **extremely light depths of cut**

Thin PVD coating with superior adhesion to substrate

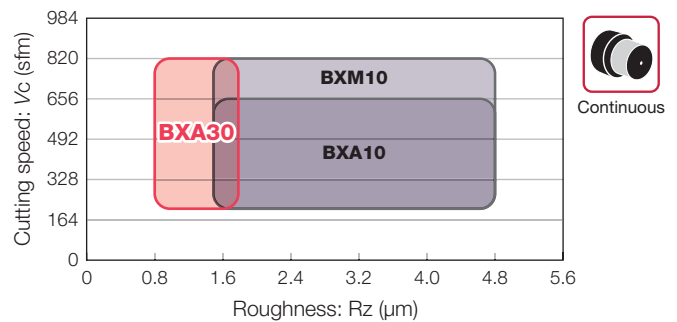
- Prevents premature insert fracture and provides machining security
- Provides good surface finish



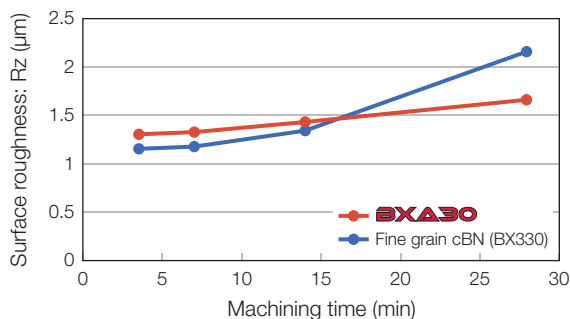
BXA30

Coated CBN grade for high quality surface finishing

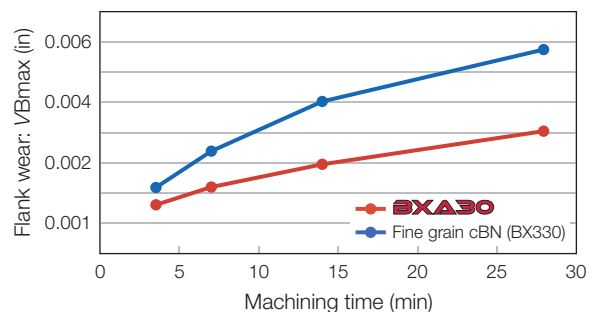
Ultra-fine cBN grain uniquely designed for superior adhesion with the PVD coating provides exceptional wear resistance and eliminates built-up edge, delivering excellent surface quality and tool life predictability.





Surface roughness



Wear resistance

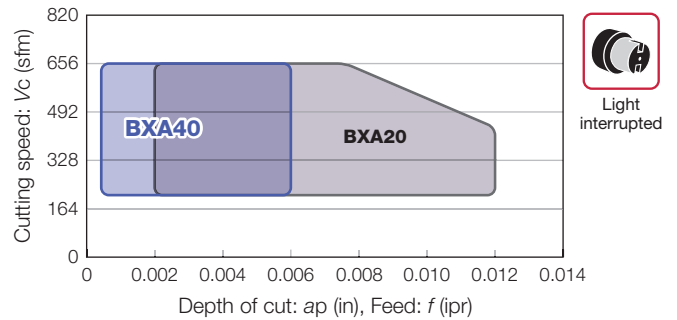


 Insert : 2QP-CNGA 432
 Workpiece material : 4140 (58HRC)
 Cutting speed : $V_c = 656$ sfm
 Feed : $f = 0.003$ ipr
 Depth of cut : $a_p = 0.006$ "
 Coolant : Wet

BXA40

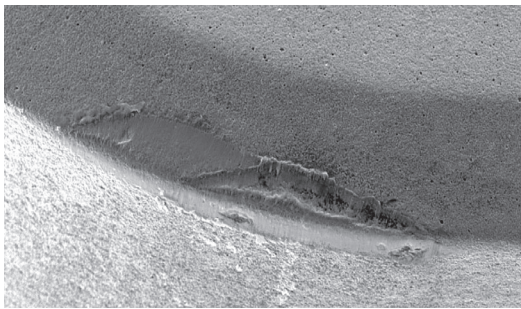
Coated CBN grade ideal of extremely light D.O.C.

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.

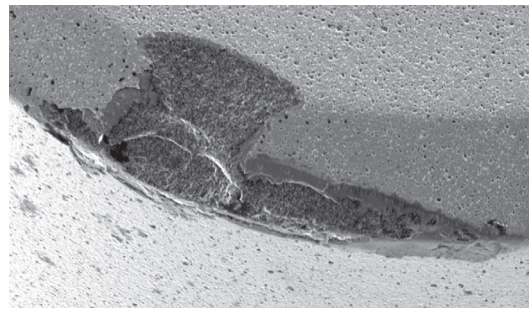


Small depth of cutting

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



BXA40



Coated CBN (BXA20)

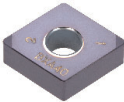
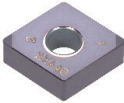
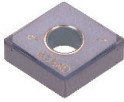
H Insert : 2QP-CNGA 432
 Workpiece material : 4140 (58HRC)
 Cutting speed : $V_c = 656$ sfm
 Feed : $f = 0.003$ ipr
 Depth of cut : $a_p = 0.001''$
 Coolant : Wet

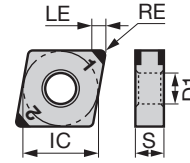
STANDARD CUTTING CONDITIONS

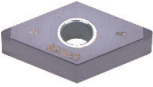
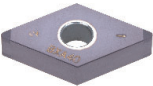
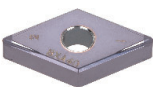
ISO	Grade	Workpiece condition	Cutting speed V_c (sfm)	Depth of cut a_p (in)	Feed f (ipr)
H	BXA30	Continuous	525 (164 - 755)	0.004 (0.001 - 0.006)	0.004 (0.001 - 0.006)
	BXA40	Light interrupted	459 (164 - 656)	0.004 (0.02 - 0.016)	0.006 (0.001 - 0.010)

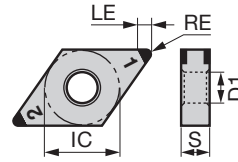
CBN INSERTS NEGATIVE TYPE

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

Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.						
	Inch	Metric				LE	RE	IC	S	D1	Standard	L	LFLC	H	Wiper	Chipbreaker	
	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							○



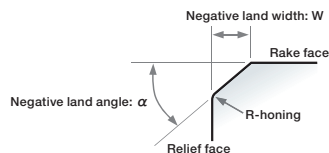
Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.						
	Inch	Metric				LE	RE	IC	S	D1	Standard	L	LFLC	H	Wiper	Chipbreaker	
	4QP-DNGA	4QP-DNGA 431 4QP-DNGA150404	●	●	4	0.098	0.016	0.500	0.187	0.203	○						
		4QP-DNGA 432 4QP-DNGA150408	●	●	4	0.083	0.031	0.500	0.187	0.203	○						
		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

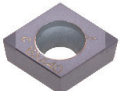


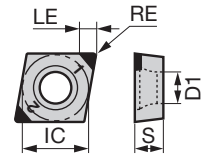
Edge prep. ID	Negative land width W	Negative land angle α
S	0	1
3	2	5

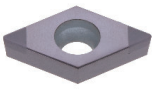
T ... Chamfered
 S ... Chamfered + R-honing
 E ... R-honing alone
 F ... Sharp edge

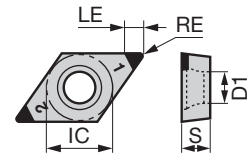
CBN INSERTS POSITIVE TYPE

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

Shape	Designation		BXA30	BXA40						Dimension (in)					Edge prep.				Wiper	Chipbreaker			
	Inch	Metric								No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L			LFLC	H	
																							LE
	2QP-CCGW	2QP-CCGW 21.50.5	2QP-CCGW060202	●●																			
		2QP-CCGW 21.51	2QP-CCGW060204	●●																			
		2QP-CCGW 32.51	2QP-CCGW09T304	●●																			
		2QP-CCGW 32.52	2QP-CCGW09T308	●●																			



Shape	Designation		BXA30	BXA40						Dimension (in)					Edge prep.				Wiper	Chipbreaker				
	Inch	Metric								No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L			LFLC	H		
																							LE	RE
	2QP-DCGW	2QP-DCGW 21.50	2QP-DCGW070202	●●																				
		2QP-DCGW 21.51	2QP-DCGW070204	●●																				
		2QP-DCGW 32.50.5	2QP-DCGW11T302	●●																				
		2QP-DCGW 32.51	2QP-DCGW11T304	●●																				
		2QP-DCGW 32.52	2QP-DCGW11T308	●●																				



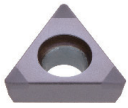
● : Line up

BXA30 / BXA40



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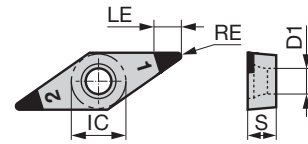
CBN INSERTS POSITIVE TYPE

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

Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.							
	Inch	Metric				LE	RE	IC	S	D1	Standard	L	LFLC	H	Wiper	Chipbreaker		
						Sharp edge												
	3QP-TPGW	3QP-TPGW 631	3QP-TPGW080204	●	●	3	0.087	0.016	0.187	0.094	0.091	○						
		3QP-TPGW 730.5	3QP-TPGW090202	●	●	3	0.091	0.008	0.219	0.094	0.098	○						
		3QP-TPGW 731	3QP-TPGW090204	●	●	3	0.087	0.016	0.219	0.094	0.098	○						
		3QP-TPGW 21.50	3QP-TPGW110202	●	●	3	0.091	0.008	0.250	0.094	0.110	○						
		3QP-TPGW 21.51	3QP-TPGW110204	●	●	3	0.087	0.016	0.250	0.094	0.110	○						
		3QP-TPGW 220.5	3QP-TPGW110302	●	●	3	0.091	0.008	0.250	0.125	0.134	○						
		3QP-TPGW 221	3QP-TPGW110304	●	●	3	0.087	0.016	0.250	0.125	0.134	○						
		3QP-TPGW 222	3QP-TPGW110308	●	●	3	0.075	0.031	0.250	0.125	0.134	○						
		3QP-TPGW 2.520.5	3QP-TPGW130302	●	●	3	0.091	0.008	0.313	0.125	0.134	○						
		3QP-TPGW 2.521	3QP-TPGW130304	●	●	3	0.087	0.016	0.313	0.125	0.134	○						
		3QP-TPGW 32.51	3QP-TPGW16T304	●	●	3	0.087	0.016	0.375	0.156	0.173	○						
		3QP-TPGW 32.52	3QP-TPGW16T308	●	●	3	0.075	0.031	0.375	0.156	0.173	○						
		3QP-TPGW 331	3QP-TPGW160404	●	●	3	0.087	0.016	0.375	0.187	0.173	○						
		3QP-TPGW 322	3QP-TPGW160408	●	●	3	0.075	0.031	0.375	0.187	0.173	○						



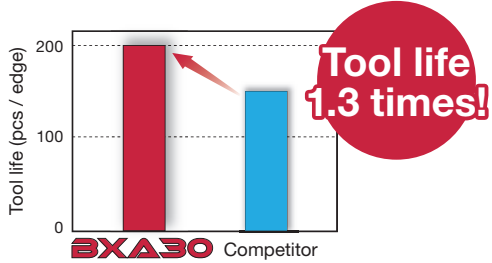
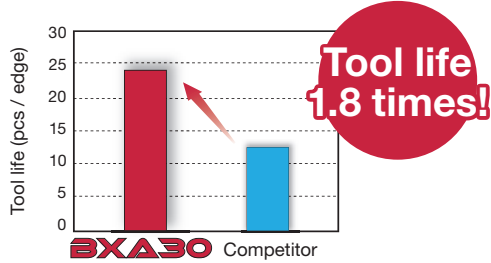
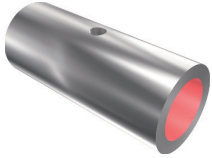
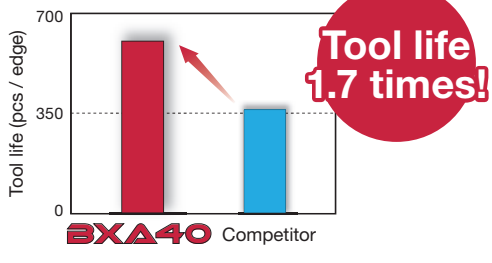


Shape	Designation		BXA30	BXA40	No. of corners	Dimension (in)					Edge prep.						
	Inch	Metric				LE	RE	IC	S	D1	Standard	L	LFLC	H	Wiper	Chipbreaker	
						Sharp edge											
	2QP-VBGW	2QP-VBGW 221	2QP-VBGW110304	●	●	2	0.122	0.016	0.250	0.125	0.110	○					
		2QP-VBGW 222	2QP-VBGW110308	●	●	2	0.087	0.031	0.250	0.125	0.110	○					
		2QP-VBGW 331	2QP-VBGW160404	●	●	2	0.122	0.016	0.375	0.187	0.173	○					
		2QP-VBGW 332	2QP-VBGW160408	●	●	2	0.087	0.031	0.375	0.187	0.173	○					
	2QP-VCGW	2QP-VCGW 331	2QP-VCGW160404	●		2	0.122	0.016	0.375	0.187	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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