

# BXA30/BXA40

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Tungaloy Report No. 536-G

## Coated CBN grades for precision finishing of hardened steel



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



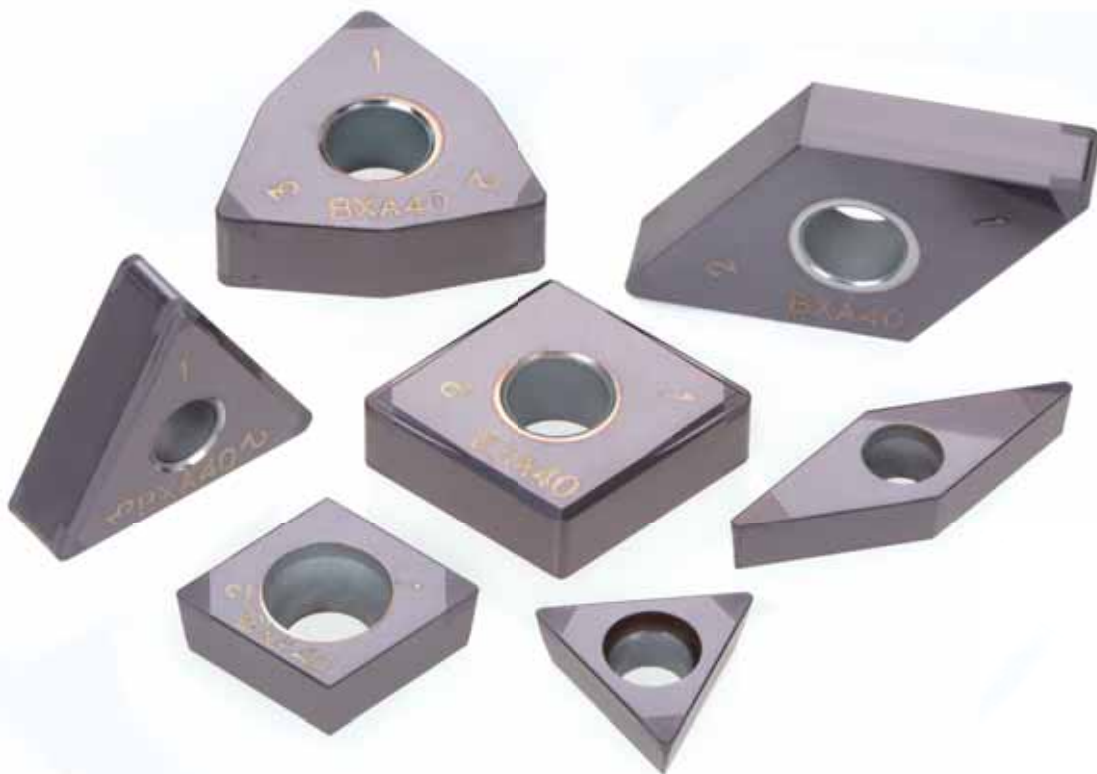
ACCELERATED MACHINING



TurnLine

# BXA30/BXA40

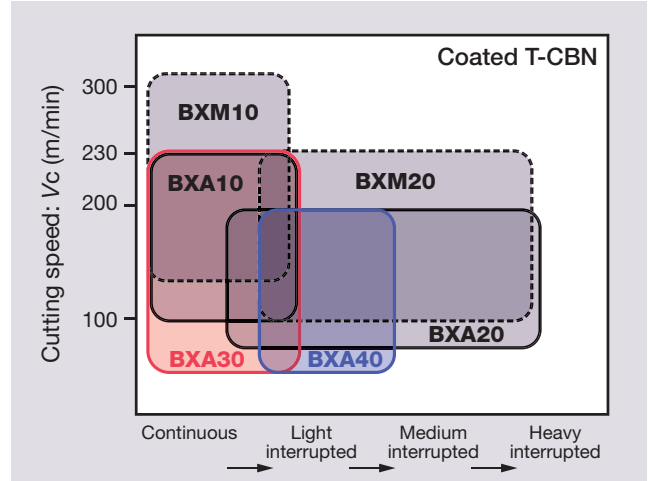
TUNGALOY



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

## Thin PVD coating with superior adhesion to substrate

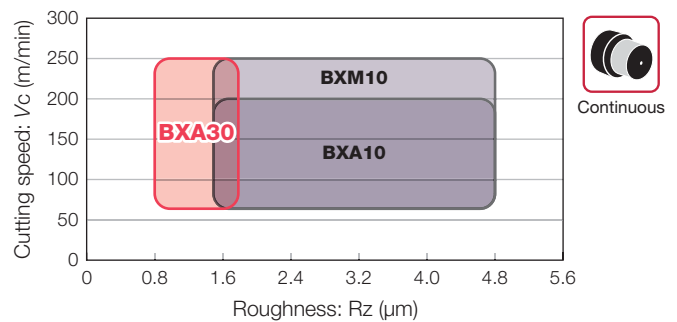
- Prevents premature insert fracture and provides machining security
- Provides good surface finish



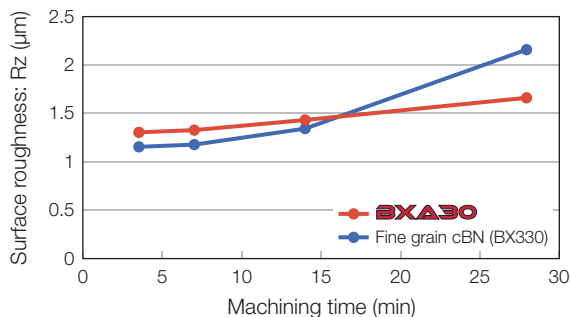
## BXA30

### Coated CBN grade for high quality surface finishing

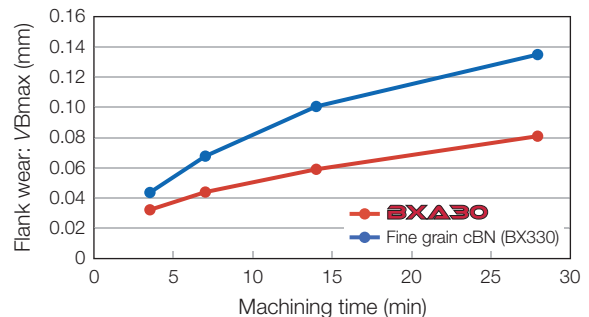
Ultra-fine cBN grain uniquely designed for superior adhesion with the PVD coating provides exceptional wear resistance and eliminates built-up edge, delivering excellent surface quality and tool life predictability.





Surface roughness



Wear resistance

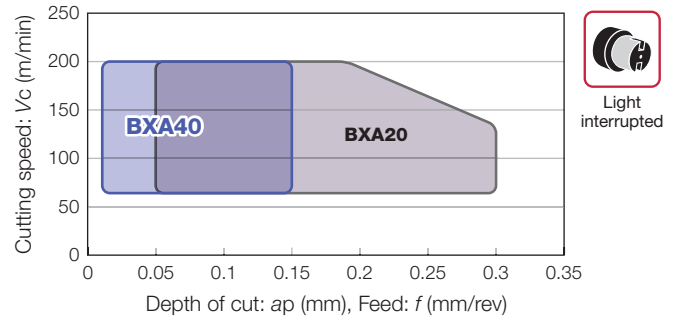


 Insert : 2QP-CNGA120408  
 Workpiece material : SCM415 (58HRC)  
 Cutting speed :  $V_c = 200$  m/min  
 Feed :  $f = 0.08$  mm/rev  
 Depth of cut :  $a_p = 0.15$  mm  
 Coolant : Wet

## BXA40

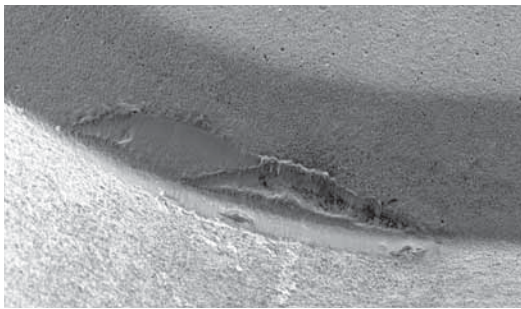
Coated CBN grade ideal of extremely light D.O.C.

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.

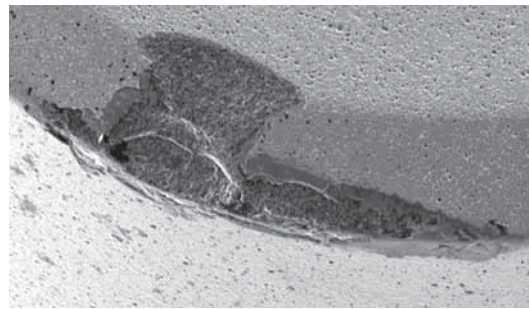


### Small depth of cutting

Depth of cut  $a_p = 0.03$  mm, Machining time 20 min



**BXA40**



Coated CBN (BXA20)

<b>H</b>	Insert	: 2QP-CNGA120408
	Workpiece material	: SCM415 (58HRC)
	Cutting speed	: $V_c = 200$ m/min
	Feed	: $f = 0.08$ mm/rev
	Depth of cut	: $a_p = 0.03$ mm
	Coolant	: Wet

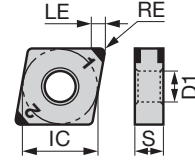
## STANDARD CUTTING CONDITIONS

ISO	Grade	Workpiece condition	Cutting speed $V_c$ (m/min)	Depth of cut $a_p$ (mm)	Feed $f$ (mm/rev)
<b>H</b>	BXA30	Continuous	160 (50 - 230)	0.1 (0.02 - 0.15)	0.1 (0.02 - 0.15)
	BXA40	Light interrupted	140 (50 - 200)	0.1 (0.02 - 0.4)	0.15 (0.02 - 0.25)

## CBN INSERTS NEGATIVE TYPE

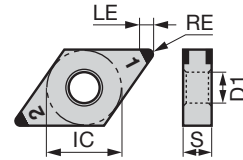
- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

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



Shape	Designation	BXA30	BXA40	Dimension (mm)						Edge prep.						
				No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker
	4QP-CNGA120404	●	●	4	2.3	0.4	12.7	4.76	5.16	○						
	4QP-CNGA120408	●	●	4	2.2	0.8	12.7	4.76	5.16	○						
	4QP-CNGA120412	●	●	4	2.4	1.2	12.7	4.76	5.16	○						
	4QP-CNGA120404-H		●	4	2.3	0.4	12.7	4.76	5.16						○	
	4QP-CNGA120408-H		●	4	2.2	0.8	12.7	4.76	5.16						○	
	4QP-CNGA120412-H		●	4	2.4	1.2	12.7	4.76	5.16						○	
	4QP-CNGG120408-HF		●	4	2.2	0.8	12.7	4.76	5.16							○
	4QP-CNGG120412-HF		●	4	2.4	1.2	12.7	4.76	5.16							○
	4QP-CNGG120408-HM		●	4	2.2	0.8	12.7	4.76	5.16							○
	4QP-CNGG120412-HM		●	4	2.4	1.2	12.7	4.76	5.16							○

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

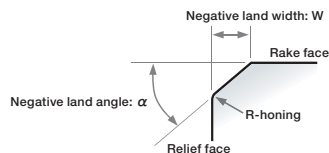


Shape	Designation	BXA30	BXA40	Dimension (mm)						Edge prep.						
				No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H	Wiper	Chipbreaker
	4QP-DNGA150404	●	●	4	2.5	0.4	12.7	4.76	5.16	○						
	4QP-DNGA150408	●	●	4	2.1	0.8	12.7	4.76	5.16	○						
	4QP-DNGA150412	●	●	4	2	1.2	12.7	4.76	5.16	○						
	4QP-DNGA150404-H		●	4	2.5	0.4	12.7	4.76	5.16						○	
	4QP-DNGA150408-H		●	4	2.1	0.8	12.7	4.76	5.16						○	
	4QP-DNGA150412-H		●	4	2	1.2	12.7	4.76	5.16						○	
	4QP-DNGG150408-HF		●	4	2.1	0.8	12.7	4.76	5.16							○
	4QP-DNGG150412-HF		●	4	2	1.2	12.7	4.76	5.16							○
	4QP-DNGG150408-HM		●	4	2.1	0.8	12.7	4.76	5.16							○
	4QP-DNGG150412-HM		●	4	2	1.2	12.7	4.76	5.16							○

● : Line up

### Edge preparation specification

	BXA30	BXA40
Standard	S01325	S01325
-H	S01335	S01335



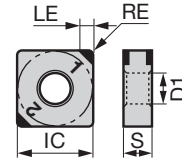
S	0	1	3	2	5
Edge prep. ID		Negative land width W		Negative land angle α	

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

## CBN INSERTS NEGATIVE TYPE

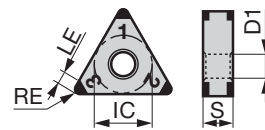
- : Continuous cutting
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- ✱ : Heavy interrupted cutting

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



Shape	Designation	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker		
				LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H				
	<b>4QP-SNGA</b> 4QP-SNGA120404	●	4	2.4	0.4	12.7	4.76	5.16	○								
	4QP-SNGA120408	●	4	2.4	0.8	12.7	4.76	5.16	○								
	4QP-SNGA120412	●	4	2.4	1.2	12.7	4.76	5.16	○								
	<b>4QP-SNGA**-H</b> 4QP-SNGA120408-H	●	4	2.4	0.8	12.7	4.76	5.16									○
	4QP-SNGA120412-H	●	4	2.4	1.2	12.7	4.76	5.16									○

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



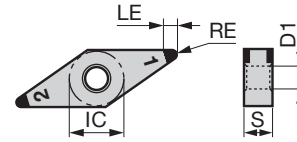
Shape	Designation	BXA30	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker	
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H			
	<b>6QP-TNGA</b> 6QP-TNGA160404	●	●	6	2.2	0.4	9.525	4.76	3.81	○							
	6QP-TNGA160408	●	●	6	1.9	0.8	9.525	4.76	3.81	○							
	6QP-TNGA160412	●	●	6	2.4	1.2	9.525	4.76	3.81	○							
	<b>6QP-TNGA**-H</b> 6QP-TNGA160404-H	●		6	2.2	0.4	9.525	4.76	3.81								○
	6QP-TNGA160408-H	●		6	2	0.8	9.525	4.76	3.81								○
	6QP-TNGA160412-H	●		6	2.4	1.2	9.525	4.76	3.81								○
	<b>6QP-TNGG**-H*</b> 6QP-TNGG160408-HF	●		6	1.9	0.8	9.525	4.76	3.81								○
	6QP-TNGG160412-HF	●		6	2.4	1.2	9.525	4.76	3.81								○
	6QP-TNGG160408-HM	●		6	1.9	0.8	9.525	4.76	3.81								○
	6QP-TNGG160412-HM	●		6	2.4	1.2	9.525	4.76	3.81								○

● : Line up

## CBN INSERTS NEGATIVE TYPE

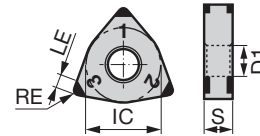
- : Continuous cutting
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- ✱ : Heavy interrupted cutting

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



Shape	Designation	BXA30	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H		
	<b>4QP-VNGA</b> 4QP-VNGA160404	●	●	4	3.1	0.4	9.525	4.76	3.81	○						
	4QP-VNGA160408	●	●	4	2.2	0.8	9.525	4.76	3.81	○						
	4QP-VNGA160412	●	●	4	3	1.2	9.525	4.76	3.81	○						
	<b>4QP-VNGA**-H</b> 4QP-VNGA160404-H		●	4	3.1	0.4	9.525	4.76	3.81							○
	4QP-VNGA160408-H		●	4	2.2	0.8	9.525	4.76	3.81							○
	<b>4QP-VNGG**-HF</b> 4QP-VNGG160408-HF		●	4	2.2	0.8	9.525	4.76	3.81							○
	4QP-VNGG160408-HM		●	4	2.2	0.8	9.525	4.76	3.81							○

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




Shape	Designation	BXA30	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LFLC	H		
	<b>6QP-WNGA</b> 6QP-WNGA080408	●		6	2.2	0.8	12.7	4.76	5.16	○						

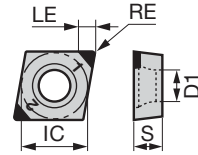
● : Line up




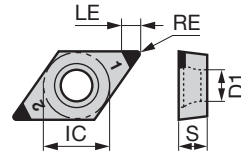
## CBN INSERTS POSITIVE TYPE

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

Shape	Designation	Dimension (mm)										Edge prep.					
		BXA30	BXA40	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge				Wiper	Chipbreaker	
											L	LF	LC	H			
	2QP-CCGW060202	●	●	2	2.3	0.2	6.35	2.38	2.8	○							
	2QP-CCGW060204	●	●	2	2.3	0.4	6.35	2.38	2.8	○							
	2QP-CCGW09T304	●	●	2	2.3	0.4	9.525	3.97	4.4	○							
	2QP-CCGW09T308	●	●	2	2.2	0.8	9.525	3.97	4.4	○							



Shape	Designation	Dimension (mm)										Edge prep.					
		BXA30	BXA40	No. of corners	LE	RE	IC	S	D1	Standard	Sharp edge				Wiper	Chipbreaker	
											L	LF	LC	H			
	2QP-DCGW070202	●	●	2	2.7	0.2	6.35	2.38	2.8	○							
	2QP-DCGW070204	●	●	2	2.5	0.4	6.35	2.38	2.8	○							
	2QP-DCGW11T302	●	●	2	2.7	0.2	9.525	3.97	4.4	○							
	2QP-DCGW11T304	●	●	2	2.5	0.4	9.525	3.97	4.4	○							
	2QP-DCGW11T308	●	●	2	2.1	0.8	9.525	3.97	4.4	○							




● : Line up

## CBN INSERTS POSITIVE TYPE

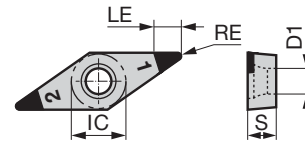
- : Continuous cutting
- : Light interrupted cutting
- : Heavy interrupted cutting



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



Shape	Designation	BXA30	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker				
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LFL	LC			H			
	<b>3QP-TPGW</b> 3QP-TPGW080204	●	●	3	2.2	0.4	4.76	2.38	2.3	○										
	3QP-TPGW090202	●	●	3	2.3	0.2	5.56	2.38	2.5	○										
	3QP-TPGW090204	●	●	3	2.2	0.4	5.56	2.38	2.5	○										
	3QP-TPGW110202	●	●	3	2.3	0.2	6.35	2.38	2.8	○										
	3QP-TPGW110204	●	●	3	2.2	0.4	6.35	2.38	2.8	○										
	3QP-TPGW110302	●	●	3	2.3	0.2	6.35	3.18	3.4	○										
	3QP-TPGW110304	●	●	3	2.2	0.4	6.35	3.18	3.4	○										
	3QP-TPGW110308	●	●	3	1.9	0.8	6.35	3.18	3.4	○										
	3QP-TPGW130302	●	●	3	2.3	0.2	7.94	3.18	3.4	○										
	3QP-TPGW130304	●	●	3	2.2	0.4	7.94	3.18	3.4	○										
	3QP-TPGW16T304	●	●	3	2.2	0.4	9.525	3.97	4.4	○										
	3QP-TPGW16T308	●	●	3	1.9	0.8	9.525	3.97	4.4	○										
	3QP-TPGW160404	●	●	3	2.2	0.4	9.525	4.76	4.4	○										
	3QP-TPGW160408	●	●	3	1.9	0.8	9.525	4.76	4.4	○										



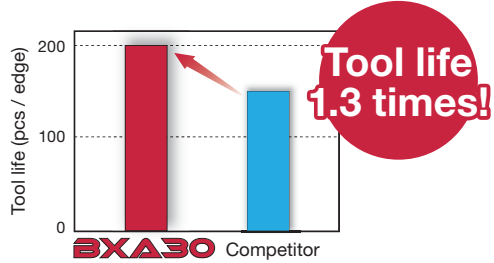
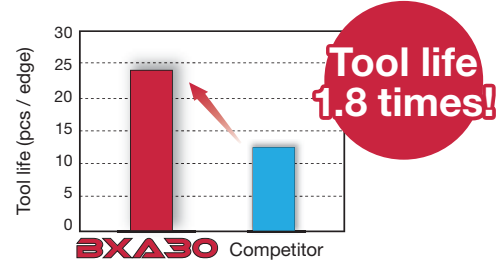

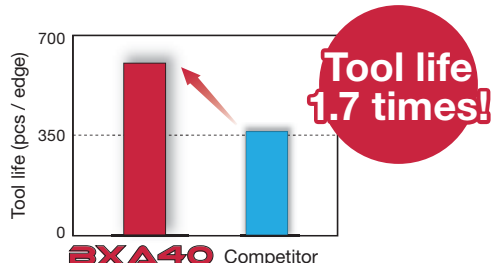
P	Steel																			
M	Stainless																			
K	Cast iron																			
N	Non-ferrous																			
S	Superalloy																			
H	Hard material	●●	●●																	



Shape	Designation	BXA30	BXA40	No. of corners	Dimension (mm)					Edge prep.					Wiper	Chipbreaker				
					LE	RE	IC	S	D1	Standard	Sharp edge	L	LFL	LC			H			
	<b>2QP-VBGW</b> 2QP-VBGW110304	●	●	2	3.1	0.4	6.35	3.18	2.8	○										
	2QP-VBGW110308	●	●	2	2.2	0.8	6.35	3.18	2.8	○										
	2QP-VBGW160404	●	●	2	3.1	0.4	9.525	4.76	4.4	○										
	2QP-VBGW160408	●	●	2	2.2	0.8	9.525	4.76	4.4	○										
	<b>2QP-VCGW</b> 2QP-VCGW160404		●	2	3.1	0.4	9.525	4.76	4.4	○										

● : Line up

## PRACTICAL EXAMPLES

Workpiece type		Machine parts (Ring)	Bearing parts
Insert		2QP-DCGW11T304	2QP-DCGW11T304
Grade		BXA30	BXA30
Workpiece material		SCM435H / 34CrMo4 (63HRC)	SUJ2 / B1 (60HRC)
		 <b>H</b>	 <b>H</b>
Cutting conditions	Cutting speed: $V_c$ (m/min)	200	167
	Feed : $f$ (mm/rev)	0.06	0.03
	Depth of cut : $a_p$ (mm)	0.08	0.05
	Coolant	Wet	Wet
Results		 <p>With a requirement to maintain surface roughness of <math>R_z = 2.4</math> 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-TPGW110304	
Grade		BXA40	
Workpiece material		SCM415H (58HRC)	
		 <b>H</b>	
Cutting conditions	Cutting speed: $V_c$ (m/min)	120	
	Feed : $f$ (mm/rev)	0.1	
	Depth of cut : $a_p$ (mm)	0.03 - 0.05	
	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>	

### Tungaloy Corporation (Head office)

11-1 Yoshima-Kogyodanchi  
Iwaki-city, Fukushima 970-1144 Japan  
Phone: +81-246-36-8501  
Fax: +81-246-36-8542  
www.tungaloy.co.jp

### Tungaloy America, Inc.

3726 N Ventura Drive  
Arlington Heights, IL 60004, U.S.A.  
Phone: +1-888-554-8394  
Fax: +1-888-554-8392  
www.tungaloy.com/us

### Tungaloy Canada

432 Elgin St. Unit 3  
Brantford, Ontario N3S 7P7, Canada  
Phone: +1-519-758-5779  
Fax: +1-519-758-5791  
www.tungaloy.com/ca

### Tungaloy de Mexico S.A.

C. Los Arellano 113,  
Parque Industrial Siglo XXI  
Aguascalientes, AGS, Mexico 20290  
Phone: +52-449-929-5410  
Fax: +52-449-929-5411  
www.tungaloy.com/mx

### Tungaloy do Brasil Ltda.

Avd. Independencia N4158 Residencial Flora  
13280-000 Vinhedo, São Paulo, Brasil  
Phone: +55-19-38262757  
Fax: +55-19-38262757  
www.tungaloy.com/br

### Tungaloy Germany GmbH

An der Alten Ziegelei 1  
D-40789 Monheim, Germany  
Phone: +49-2173-90420-0  
Fax: +49-2173-90420-19  
www.tungaloy.com/de

### Tungaloy France S.A.S.

ZA Courtaboeuf - Le Rio  
1 rue de la Terre de feu  
F-91952 Courtaboeuf Cedex, France  
Phone: +33-1-6486-4300  
Fax: +33-1-6907-7817  
www.tungaloy.com/fr

### Tungaloy Italia S.r.l.

Via E. Andolfato 10  
I-20126 Milano, Italy  
Phone: +39-02-252012-1  
Fax: +39-02-252012-65  
www.tungaloy.com/it

### Tungaloy Czech s.r.o.

Turanka 115  
CZ-627 00 Brno, Czech Republic  
Phone: +420-532 123 391  
Fax: +420-532 123 392  
www.tungaloy.com/cz

### Tungaloy Ibérica S.L.

C/Miquel Servet, 43B, Nau 7  
Pol. Ind. Bufalvent  
ES-08243 Manresa (BCN), Spain  
Phone: +34 93 113 1360  
Fax: +34 93 876 2798  
www.tungaloy.com/es

### Tungaloy Scandinavia AB

Bultgatan 38  
442 40 Kungälv, Sweden  
Phone: +46-462119200  
Fax: +46-462119207  
www.tungaloy.com/se

### Tungaloy Rus, LLC

Andropova avenue, h.18/7,  
11 floor, office 3, 115432,  
Moscow, Russia  
Phone: +7-499-683-01-80  
Fax: +7-499-683-01-81  
www.tungaloy.com/ru

### Tungaloy Polska Sp. z o.o.

Ul. Irysowa 1, 55-040 Bielany  
Wroclawskie, Poland  
Phone: +48 607 907 237  
www.tungaloy.com/pl

### Tungaloy U.K. Ltd

Gallan Park, Watling Street,  
Cannock, WS110XG, UK  
Phone: +44 121 4000 231  
Fax: +44 121 270 9694  
www.tungaloy.com/uk

### Tungaloy Hungary Kft

Erzsébet királyné útja 125  
H-1142 Budapest, Hungary  
Phone: +36 1 781-6846  
Fax: +36 1 781-6866  
www.tungaloy.com/hu

### Tungaloy Turkey

Serifali Mah.bayraktar Bulvari Kule Sk. No:26  
34775 Umraniye / Istanbul / Turkey  
Phone: +90 216 540 04 67  
Fax: +90 216 540 04 87  
www.tungaloy.com/tr

### Tungaloy Benelux b.v.

Tjalk 70  
NL-2411 NZ Bodegraven, Netherlands  
Phone: +31 172 630 420  
Fax: +31 172 630 429  
www.tungaloy.com/nl

### Tungaloy Croatia

Ulica bana Josipa Jelačića 87,  
10430, Samobor, Croatia  
Phone: +385 1 3326 604  
Fax: +385 1 3327 683  
www.tungaloy.com/hr

### Tungaloy Cutting Tool (Shanghai) Co.,Ltd.

Rm No 401 No.88 Zhabei  
Jiangchang No.3 Rd  
Shanghai 200436, China  
Phone: +86-21-3632-1880  
Fax: +86-21-3621-1918  
www.tungaloy.com/cn

### Tungaloy Cutting Tools (Taiwan) Co.,Ltd.

9F, No.293, Zhongyang Rd,  
Xinzhuan Dist, New Taipei City,  
24251 Taiwan  
Phone: +886-2-8521-9986  
Fax: +886-2-8521-8935  
www.tungaloy.com/tw

### Tungaloy Cutting Tools (Thailand) Co.,Ltd.

Interlink tower 4th Fl.  
1858/5-7 Bangna-Trad Road  
km.5 Bangna, Bangna, Bangkok 10260  
Thailand  
Phone: +66-2-751-5711  
Fax: +66-2-751-5715  
www.tungaloy.com/th

### Tungaloy Singapore (Pte.), Ltd.

62 Ubi Road 1, #06-11 Oxley BizHub 2  
Singapore 408734  
Phone: +65-6391-1833  
Fax: +65-6299-4557  
www.tungaloy.com/sing

### Tungaloy Vietnam

LE04.38, Lexington Residence  
67 Mai Chi Tho St., Dist. 2,  
Ho Chi Minh City, Vietnam  
Phone: +84-2837406660  
www.tungaloy.com/sing

### Tungaloy India Pvt. Ltd.

Indiabulls Finance Centre,  
Unit # 902-A, 9th Floor,  
Tower 1, Senapati Bapat Marg,  
Elphinstone Road (West),  
Mumbai-400013, India  
Phone: +91-22-6124-8804  
Fax: +91-22-6124-8899  
www.tungaloy.com/in

### Tungaloy Korea Co., Ltd

#1312, Byucksan Digital Valley 5-cha  
Beotkkot-ro 244, Geumcheon-gu  
153-788 Seoul, Korea  
Phone: +82-2-2621-6161  
Fax: +82-2-6393-8952  
www.tungaloy.com/kr

### Tungaloy Malaysia Sdn Bhd

50 K-2, Kelana Mall, Jalan SS6/14  
Kelana Jaya, 47301  
Petaling Jaya, Selangor Darul Ehsan  
Malaysia  
Phone: +603-7805-3222  
Fax: +603-7804-8563  
www.tungaloy.com/my

### Tungaloy Australia Pty Ltd

Unit 68 1470 Ferntree Gully Road  
Knoxfield 3180 Victoria, Australia  
Phone: +61-3-9755-8147  
Fax: +61-3-9755-6070  
www.tungaloy.com/au

### PT. Tungaloy Indonesia

Kompleks Grand Wisata Block AA-10 No.3-5  
Cibitung  
Bekasi 17510, Indonesia  
Phone: +62-21-8261-5808  
Fax: +62-21-8261-5809  
www.tungaloy.com/id



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