

Jungaloy Member IMC Group

Tungaloy Report No. 388-US



The new standard for hardened steel machining





New coated CBN grades BXN series



Standard cutting condition

Application	Grades	Machining Mode	Cutting Speed Vc (SFM)	Depth of cut ap(in)	Feed f(ipr)
		Continuous	500 - 1150	.002012	.001007
Н	DAIVITU	Light interrupted	500 - 800	.002012	.001006
Hard Materials		Continuous	230 - 700	.002012	.002010
	DAIVI20	Interrupted	230 - 700	.002012	.002006

Applicable for all types of hardened steel turning



Unique CBN substrate

High chipping resistance !! Extremely tough Substrate !!

Application range



Comparison of damage BMX20 has normal wear pattern without peeling



Competitor

Insert	: 2QP-CNGA 432
Work material	: SCM415H (60HRC)
Cutting speed	: Vc = 430 SFM
Feed	: f = .006 ipr
Depth of cut	: ap = .006"
Coolant	: Water soluble



- h

5 times longer tool life !

nterrupted cutting	Removing carburized layer	Continuous cutting
/c = 430 SFM	Vc = 360 SFM	Vc = 430 SFM
= .006 ipr	f = .005 ipr	f = .006 ipr
ap = .006 in	ap = .024 in	ap = .006 in
Insert Work material Coolant	: 2QP-CNGA 432 : SCM415H : Water soluble	

BXM SERIES



"Hard Breakers" for removing the carburized layer from case hardened shafts.

Two types of chipbreaker provide excellent chip control in a wide application range !



For medium cutting



HIVI type

Single sided CBN insert provides higher stability in heavy machining.

Providing ideal chip control in large D.O.C due to the well designed chipbreaker. Suitable for medium cutting or roughing. Example of chips



Standard cutting condition (for removing the carburized layer)

Application	Grades	Machining Mode	Cutting Speed Vc (SFM)	Depth of cut ap(in)	Feed f(ipr)
Н	BXM20	HF	230 - 720	.008030	.002008
Hard Materials	BAWZU	НМ	230 - 720	.020039	.002008

BXM SERIES

Wiper edge inserts

A finishing edge (wiper edge) is formed at the point of intersection between the corner radius and the straight cutting edge.

Effect of wiper edge

Doubles the productivity \longrightarrow Reduced machining time The wiper edge can double the feed rate and suppresses deterioration of the surface finish.

**f* ≦ .012 ipr

Superior surface finishes

→ By integrating roughing and finishing into one process, the productivity can be increased.

Compared with conventional inserts, surface roughness can be improved with the wiper edge.

Comparison of surface finish with hardened steel at 60 - 62 HRC

Without wiper	
With wiper edge	 Ra: 0.10 μm, Rz: 1.03 μm





Note for using of wiper edge

The wiper edge needs to contact the work piece at a right angle.

- For the wiper edge, the toolholder should have an end cutting angle as shown in the illustration.
- In using the wiper edge a highly rigid toolholder like the A-Style toolholder is recommended. In the table below, recommended toolholders are shown.



End cutting angle, recommended toolholders

	2QP-CNGA 432 WL	3QP-WNGA 432 WL	2QP-DNGA 432 WJ	3QP-TNGA 332 WG
End cutting angle	9	5°	93°	91°
				ATGNR/L163-A
External	AGLINH/L104-A	AVVLINN/LI04-A	ADJINH/LT04-A	ATFNR/L163-A
toolholder				DTGNR/L163
	DOLINH/L104	DWLINH/L104	DDJNN/L104	DTFNR/L163
Internal toolholder	A***-ACLNR/L4-D***	A***-AWLNR/L4-D***	A***-ADUNR/L4-D***	A***-ATFNR/L3-D***

Designation System

0	QF		CN	IG	A432		WL
1 Num	ber of edges	2 Type	BN	3 ISO s (Base	ymbols ed on ANSI standard)	Addi Without	tional symbol Standard honing
2	One side	QP TA	C insert			-L	Light honing for low cutting force
3	type					-H	Heavy honing for toughness
						WG	Wiper edge, 91° end cutting angle
						WJ	Wiper edge, 93° end cutting angle
н	onina sn	ecifica	tion			WL	Wiper edge, 95° end cutting angle
		comoa				4 Chip	breaker symbol
]	-HF	For finishing
Stan	dard honing	: .005 in × 2	5° +R-I	noning		-HM	For medium cutting to roughing

Standard honing	: .005 in × 25°	+R-honing
"-L" honing	: .005 in × 15°	+R-honing
"-H" honing	: .005 in × 35°	+R-honing

Smaller honing angle makes the edge sharper with lower cutting forces.

Larger honing angle makes the edge tougher.



Inserts (Negative type)

			Gra	des			Di	mensions	(in)	
Features	Shape	Cat. No.			No. of	I.C.dia	Thickness	Hole dia	Corner R	CBN Length
			BXM10	BXM20	Connero	ød	S	ød1	٢٤	a
		2QP-CNGA 431							.016	.090
Standard		2QP-CNGA 432			2	.500	.187	.203	.031	.086
		2QP-CNGA 433		•]				.047	.094
		2QP-CNGA 431-L							.016	.090
Light		2QP-CNGA 432-L			2	.500	.187	.203	.031	.086
noning		2QP-CNGA 433-L		•	1				.047	.094
		2QP-CNGA 431-H							.016	.090
Heavy		2QP-CNGA 432-H			2	.500	.187	.203	.031	.086
noning		2QP-CNGA 433-H			1				.047	.094
		2QP-CNGA 431WL							.016	.090
Wiper edge		2QP-CNGA 432WL			2	.500	.187	.203	.031	.086
		2QP-CNGA 433WL			1				.047	.094
		2QP-DNGA 431	•	•					.016	.098
		2QP-DNGA 432	•	•	2	.500	.187	.203	.031	.082
		2QP-DNGA 433	•	•	1				.047	.078
Standard		2QP-DNGA 441	0	•					.016	.098
		2QP-DNGA 442	0	•	2	.500	.250	.203	.031	.082
		2QP-DNGA 443	0	•					.047	.078
		2QP-DNGA 431-L		•					.016	.098
Light		2QP-DNGA 432-L		•	2	.500	.187	.203	.031	.082
noning		2QP-DNGA 433-L		•	1				.047	.078
		2QP-DNGA 431-H		•					.016	.098
Heavy		2QP-DNGA 432-H		•	2	.500	.187	.203	.031	.082
noning		2QP-DNGA 433-H		•					.047	.078
		2QP-DNGA 431WJ	•	•	-				.016	.094
Wiper edge		2QP-DNGA 432WJ	•	•	2	.500	.187	.203	.031	.082
		2QP-SNGA 431		•					.016	.094
Standard		2QP-SNGA 432		•	2	.500	.250	.203	.031	.094
		2QP-SNGA 433			1				.047	.094
Light		2QP-SNGA 432-L		•	-				.031	.094
honing		2QP-SNGA 433-L			2	.500	.250	.203	.047	.094
Heavv		2QP-SNGA 432-H			•	500	050	000	.031	.094
honing		2QP-SNGA 433-H			2	.500	.250	.203	.047	.094
		3QP-TNGA 331	•	•					.016	.086
Standard		3QP-TNGA 332	•		3	.375	.187	.150	.031	.074
		3QP-TNGA 333			1				.047	.094
		3QP-TNGA 331-L	-			<u> </u>		<u> </u>	.016	.086
Light		3QP-TNGA 332-L		•	3	.375	.187	.150	.031	.074
noning		3QP-TNGA 333-L		•		-	_		.047	.094
		3QP-TNGA 331-H	1						.016	.086
Heavy		3QP-TNGA 332-H		•	3	.375	.187	.150	.031	.074
noning		3QP-TNGA 333-H		•	1				.047	.094
		3QP-TNGA 331WG		0	-				.016	.094
Wiper edge		3QP-TNGA 332WG	1	0	3	.375	.187	.150	.031	.086
		2QP-VNGA 331		•					.016	.122
Standard		2QP-VNGA 332	•	•	2	.375	.187	.150	.031	.086
	_	2QP-VNGA 333			1				.047	.118
Liaht		2QP-VNGA 331-L			_		10-	4 5 5	.016	.122
honing		2QP-VNGA 332-L	1		2	.375	.187	.150	.031	.086
Heavy		2QP-VNGA 331-H			2	075	107	450	.016	.122
honing		2QP-VNGA 332-H			2	.375	.187	.150	.031	.086
Standard		3QP-WNGA 432			_				.031	.086
Wiper edge		3QP-WNGA 432WL			3	.500	.187	.203	.031	.086
					<u> </u>			1		

: Stocked items
 : Japan Stocked

Inserts (Negative type with chipbreaker)

			Gra	des			Diı	nensions	(in)	
Features	Shape	Cat. No.	BXM10	BXM20	No. of corners	I.C.dia ød	Thickness s	Hole dia ød1	Corner R rε	CBN Length a
		2QP-CNGM 432-HF		•	2	.500		.203	.031	.086
		2QP-CNGM 433-HF		•	2	.500		.203	.047	.094
		2QP-DNGM 432-HF		•	2	.500		.203	.031	.082
With		2QP-DNGM 433-HF		•	2	.500	.187	.203	.047	.078
chipbreaker		3QP-TNGM 332-HF		•	3	.375		.150	.031	.074
		3QP-TNGM 333-HF		•	3	.375		.150	.047	.094
		2QP-VNGM 332-HF		•	2	.375		.150	.031	.086
		2QP-CNGM 432-HM		•	2	.500		.203	.031	.086
		2QP-CNGM 433-HM		•	2	.500		.203	.047	.094
		2QP-DNGM 432-HM		•	2	.500		.203	.031	.082
With		2QP-DNGM 433-HM		•	2	.500	.187	.203	.047	.078
chipbreaker		3QP-TNGM 332-HM		•	3	.375		.150	.031	.074
		3QP-TNGM 333-HM		•	3	.375]	.150	.047	.094
		2QP-VNGM 332-HM		•	2	.375]	.150	.031	.086

Inserts (Positive type)

			Gra	des				Dimens	ions (in)		
Features	Shape	Cat. No.	DVM	BYMOO	corners		I.C.dia	Thickness	Hole dia	Corner R	CBN Length
			BXM10	BXM20		ød	ød	S	ød1	٢٤	a
		2QP-CCGW060202		\bullet	2	7°	.250	.093	.110	.008	.090
		2QP-CCGW060204		●	2	7°	.250	.093	.110	.016	.090
		2QP-CCGW09T304		•	2	7°	.375	.156	.173	.016	.090
	<u> </u>	2QP-CCGW09T308			2	7°	.375	.156	.173	.031	.086
		2QP-DCGW070202		●	2	7°	.250	.093	.110	.008	.106
		2QP-DCGW070204		●	2	7°	.250	.093	.110	.016	.098
		2QP-DCGW11T302			2	7°	.375	.156	.173	.008	.106
		2QP-DCGW11T304			2	7°	.375	.156	.173	.016	.098
		2QP-DCGW11T308		•	2	7°	.375	.156	.173	.031	.082
		3QP-TPGW080204		●	3	11°	.187	.093	.090	.016	.086
		3QP-TPGW090202		•	3	11°	.187	.093	.090	.008	.090
		3QP-TPGW090204			3	11 °	.187	.093	.090	.016	.086
		3QP-TPGW110202			3	11°	.250	.093	.110	.008	.090
Standard		3QP-TPGW110204		●	3	11°	.250	.093	.110	.016	.086
Stanuaru		3QP-TPGW110302		•	3	11°	.250	.125	.133	.008	.090
		3QP-TPGW110304		•	3	11 °	.250	.125	.133	.016	.086
		3QP-TPGW110308		•	3	11 °	.250	.125	.133	.031	.078
		3QP-TPGW130302		●	3	11°	.312	.125	.133	.008	.090
		3QP-TPGW130304			3	11°	.312	.125	.133	.016	.086
		3QP-TPGW16T304			3	11 °	.375	.156	.173	.016	.086
		3QP-TPGW16T308			3	11 °	.375	.156	.173	.031	.074
		3QP-TPGW160404	•	•	3	11 °	.375	.187	.173	.016	.086
		3QP-TPGW160408		•	3	11 °	.375	.187	.173	.031	.078
		2QP-VBGW110304			2	5°	.250	.125	.110	.016	.122
		2QP-VBGW110308		•	2	5°	.250	.125	.110	.031	.086
		2QP-VBGW160404			2	5°	.375	.187	.173	.016	.122
	-	2QP-VBGW160408			2	5°	.375	.187	.173	.031	.086
		2QP-VCGW160404	•	•	2	7°	.375	.187	.173	.016	.122

• : Stocked items



Practical Examples

	Work piece type	Automotive parts	Automotive parts		
	Insert	2QP-VNGA 431	2QP-DNGA 431		
-	Grade	BXM10	BXM10		
		SCr420, 20Cr4(H) (60 ~ 65HRC)	SCM420H (58 ~ 60HRC)		
	Work material	c3.94 in	ol.57lin		
suc	Cutting speed: Vc (SFM)	490	660		
ditio	Feed: f (ipr)	.003	.004		
con	Depth of cut: ap (in)	.006	.008		
ting	Machining	Continuous cutting	Continuous cutting		
Cut	Coolant	Dry	Dry		
	Results	3000 2000 1000 0 BXM10 Competitor Excellent surface roughness.	by 120 100 80 60 40 20 0 BXM10 Competitor Doubled tool life tool life due to higher wear		
			resistance.		
	Work piece type	Automotive parts	resistance. Automotive parts		
	Work piece type Insert	Automotive parts 2QP-CNGA 432	resistance. Automotive parts 2QP-CNGA 432		
	Work piece type Insert Grade	Automotive parts 2QP-CNGA 432 BXM20	Automotive parts 2QP-CNGA 432 BXM20		
	Work piece type Insert Grade Work material	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H)	Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC)		
suc	Work piece type Insert Grade Work material	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H)	Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC)		
ditions	Work piece type Insert Grade Work material Cutting speed: Vc (SFM) Feed: f (ipr)	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H) 390 .005	Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC) Image: Comparison of the second secon		
conditions	Work piece type Insert Grade Work material Cutting speed: Vc (SFM) Feed: f (ipr) Depth of cut: ap (in)	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H) 390 .005 .012	Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC) <u> <u> </u></u>		
ting conditions	Work piece type Insert Grade Work material Cutting speed: Vc (SFM) Feed: f (ipr) Depth of cut: ap (in) Machining	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H)	resistance. Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC) Image: Colspan="2">Image: Colspan="2" Image: Colspan="		
Cutting conditions	Work piece type Insert Grade Work material Cutting speed: Vc (SFM) Feed: f (ipr) Depth of cut: ap (in) Machining Coolant	Automotive parts 2QP-CNGA 432 BXM20 SCr420, 20Cr4(H) 390 .005 .012 Continuous cutting Water soluble	resistance. Automotive parts 2QP-CNGA 432 BXM20 SKH54, HS6-5-4 (63 ~ 64HRC) Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">Image: Colspan="2">Image: Colspan="2" Image: Colspan="		







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