



TurnLine



For more information

Internal turning tool

MINI^{FORCE}**TURN**

Tungaloy Report No. 417S2-US

New **CBN**-tipped **DXGQ/U** inserts



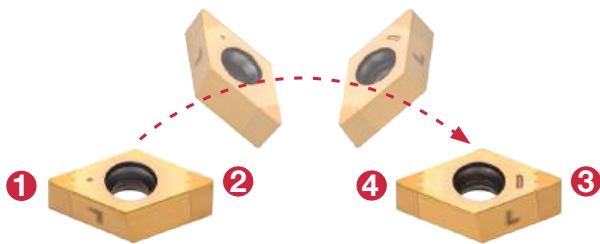
Expansion of economical MiniForceTurn **CBN** grade insert line for hardened steel part turning

New DXGQ/U inserts for profiling and back turning

New

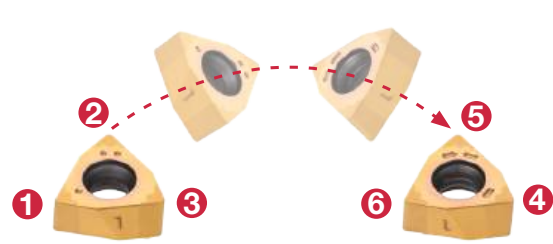
DXGQ/U insert

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



WXGQ/U insert

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



APPLICATIONS: INTERNAL TURNING AND PROFILING OF HARDENED STEEL PARTS

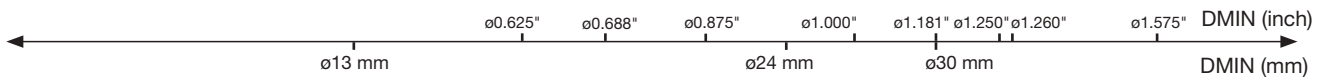
New

DXGQ/U insert

MINIFORCE CBN

Positive ISO CBN

Cost-efficient double-sided CBN inserts covers minimum bore diameters from 0.625" to 1.250"

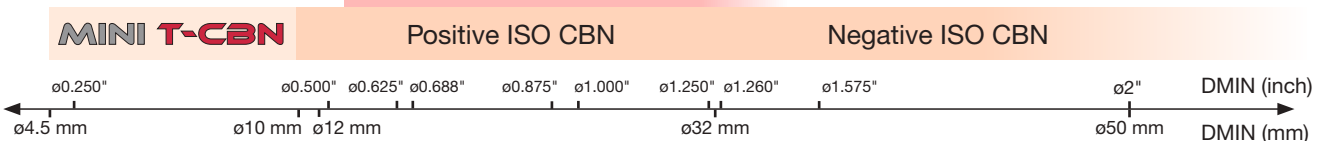


WXGQ/U insert

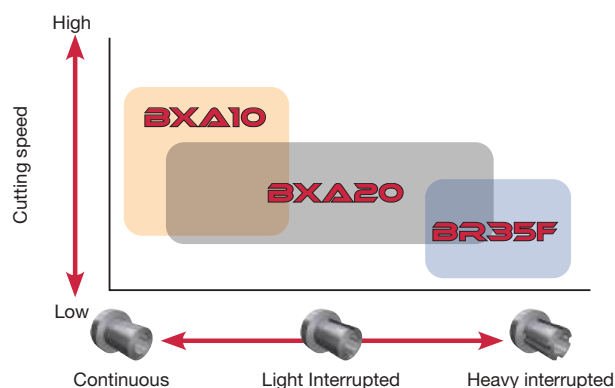
MINIFORCE CBN

Positive ISO CBN

Cost-efficient double-sided CBN inserts covers minimum bore diameters from 0.500" to 1.250"



APPLICATION AREA



BXA10

- First choice for continuous to light interrupted cuts
- For $V_c = 754$ sfm or less

BXA20

- Versatile grade from continuous to heavy interrupted cuts
- For $V_c = 590$ sfm or less

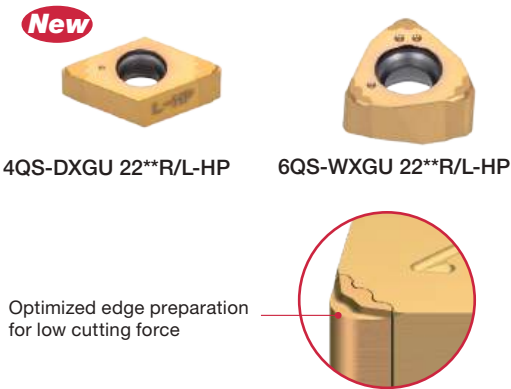
BR35F

- First choice for heavy interrupted cuts
- For $V_c = 492$ sfm or less

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.

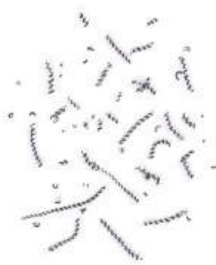


CHIP CONTROL

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	: $V_c = 492$ sfm
	Feed	: $f = 0.0039$ ipr
	Depth of cut	: $a_p = 0.0039$ "
	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.

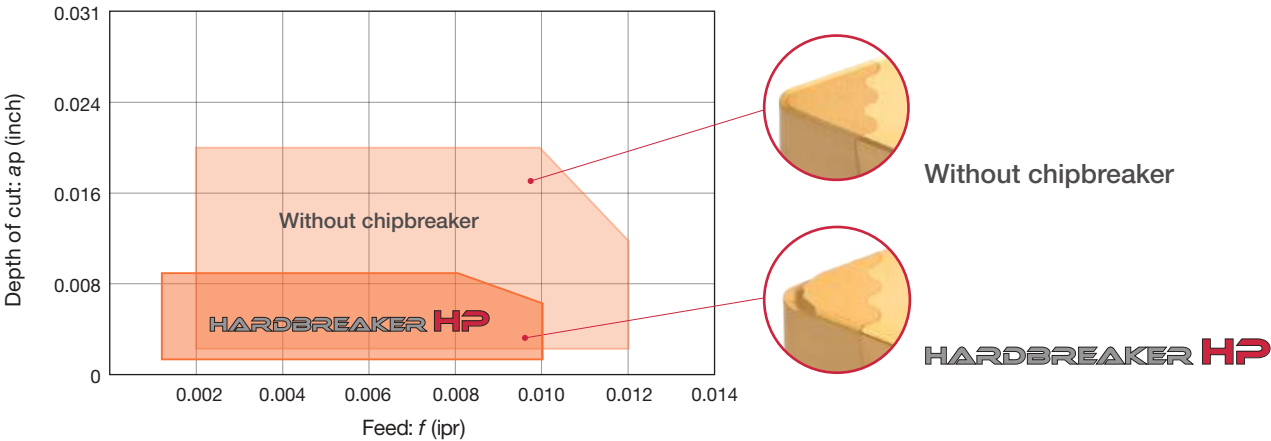
	Tool overhang (inch)						
	1.181	1.378	1.575	1.772	1.969	2.165	2.362
HARDBREAKER HP	OK						Chatter
Competitor's ISO insert (w/o chipbreaker)	OK	OK	Chatter	Chatter	Chatter	Chatter	Chatter

OK Chatter

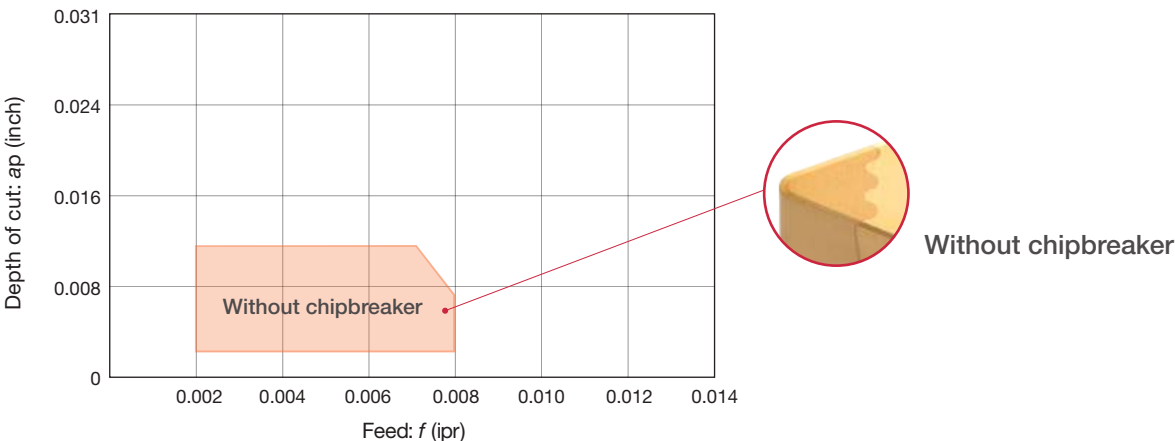
H	Insert	: 6QS-WXGU040304L-HP BXA10
	Toolholder	: A16Q-SWLXR04-D180
	Workpiece material	: SCM420 / 42CrMo4 (60HRC)
	Cutting speed	: $V_c = 492$ sfm
	Feed	: $f = 0.0039$ ipr
	Depth of cut	: $a_p = 0.0039$ "
	Coolant	: Wet
	Application	: Continuous cut, I.D. turning

APPLICATION AREA

Continuous turning



Interrupted turning

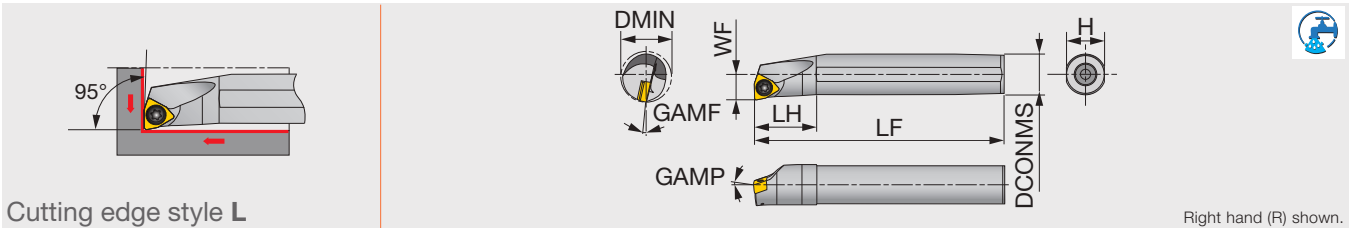


STANDARD CUTTING CONDITIONS

ISO	Grade	Workpiece condition	Cutting speed V_c (sfm)	Depth of cut a_p (inch)	Feed f (ipr)
H	BXA10	Continuous	328 - 755	0.002 - 0.020	0.002 - 0.012
		Light interrupted	328 - 755	0.002 - 0.012	0.002 - 0.008
	BXA20	Continuous	197 - 591	0.002 - 0.020	0.002 - 0.012
		Interrupted	197 - 591	0.002 - 0.012	0.002 - 0.008
	BR35F	Heavy interrupted	164 - 492	0.002 - 0.012	0.002 - 0.008

A/E-SWLXR/L

Screw-on boring bar, for WXGQ/U inserts



Inch Designation	Material	DMIN	DCONMS	WF	LF	LH	H	GAMP	GAMF	RE**	Insert	Torque*
A06-SWLXR/L2-D08	STEEL	0.500	0.375	0.281	5.000	0.750	0.350	-10.0	-14.0	0.0160	WXGQ/U22**L/R...	0.66
A08-SWLXR/L2-D11	STEEL	0.688	0.500	0.406	5.000	1.000	0.475	-10.0	-10.0	0.0160	WXGQ/U22**L/R...	0.66
A10-SWLXR/L2-D14	STEEL	0.875	0.625	0.531	7.000	1.250	0.600	-10.0	-8.0	0.0160	WXGQ/U22**L/R...	0.66
A12-SWLXR/L2-D16	STEEL	1.000	0.750	0.593	7.000	1.438	0.725	-10.0	-7.0	0.0160	WXGQ/U22**L/R...	0.66
E06-SWLXR/L2-D08	CARBIDE	0.500	0.375	0.281	5.000	1.000	0.350	-10.0	-14.0	0.0160	WXGQ/U22**L/R...	0.66
E08-SWLXR/L2-D11	CARBIDE	0.688	0.500	0.406	5.000	1.063	0.475	-10.0	-10.0	0.0160	WXGQ/U22**L/R...	0.66
E10-SWLXR/L2-D14	CARBIDE	0.875	0.625	0.531	7.000	1.250	0.600	-10.0	-8.0	0.0160	WXGQ/U22**L/R...	0.66
E12-SWLXR/L2-D16	CARBIDE	1.000	0.750	0.593	7.000	1.438	0.725	-10.0	-7.0	0.0160	WXGQ/U22**L/R...	0.66

*Torque: Recommended torque (lb-ft) for clamping **RE: The holder measurements are true with this insert radius
Note: Use the right hand toolholder (R) for the left hand insert (L). Use the left hand toolholder (L) for the right hand insert (R)

SPARE PARTS

Designation	Clamping screw	Wrench
A/E**-SWLXR/L...	SR34-514	T-7F

- 1 Use the right hand toolholder (R) for the left hand insert (L)
- 2 Use the left hand toolholder (L) for the right hand insert (R)



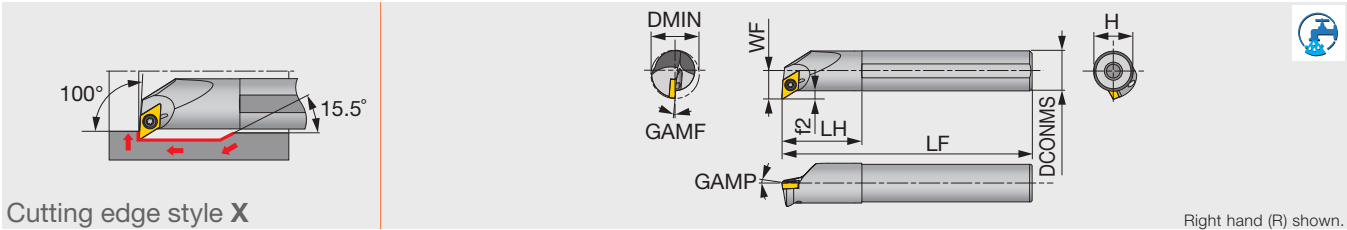
1 Right hand toolholder with left hand insert shown



2 Left hand toolholder with right hand insert shown

A/E-SDXXR/L

Screw-on boring bar, for DXGQ/U inserts



Designation	Material	DMIN	DCONMS	WF	LF	LH	H	f2	GAMP	GAMF	RE**	Insert	Torque*
A06-SDXXR/L2-D10	Steel	0.625	0.375	0.406	5	0.750	0.350	0.218	-14.0	-12.0	0.0160	DXGQ/U22**L/R...	0.66
A08-SDXXR/L2-D11	Steel	0.688	0.500	0.406	5	1.000	0.475	0.156	-13.5	-11.0	0.0160	DXGQ/U22**L/R...	0.66
A10-SDXXR/L2-D14	Steel	0.875	0.625	0.531	7	1.250	0.600	0.218	-13.0	-9.0	0.0160	DXGQ/U22**L/R...	0.66
A12-SDXXR/L2-D16	Steel	1.000	0.750	0.593	7	1.438	0.725	0.218	-13.0	-8.0	0.0160	DXGQ/U22**L/R...	0.66
E06-SDXXR/L2-D10	Carbide	0.625	0.375	0.406	5	1.000	0.350	0.210	-14.0	-12.0	0.0160	DXGQ/U22**L/R...	0.66
E08-SDXXR/L2-D11	Carbide	0.688	0.500	0.406	5	1.063	0.475	0.150	-13.5	-11.0	0.0160	DXGQ/U22**L/R...	0.66
E10-SDXXR/L2-D14	Carbide	0.875	0.625	0.531	7	1.250	0.600	0.210	-13.0	-9.0	0.0160	DXGQ/U22**L/R...	0.66
E12-SDXXR/L2-D16	Carbide	1.000	0.750	0.593	7	1.438	0.725	0.210	-13.0	-8.0	0.0160	DXGQ/U22**L/R...	0.66

*Torque: Recommended torque (lb-ft) for clamping **RE: The holder measurements are true with this insert radius
Note: Use right-hand toolholders (R) with left-hand inserts (L); and left-hand toolholders (L) with right-hand inserts (R)

SPARE PARTS		
Designation	Clamping screw	Wrench
A/E**-SDXXR/L...	SR34-514	T-7F

- 1 Use the right hand toolholder (R) for the left hand insert (L)
- 2 Use the left hand toolholder (L) for the right hand insert (R)



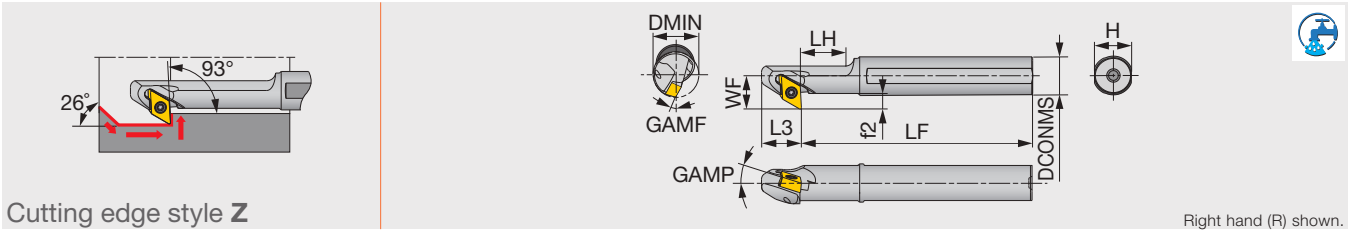
1 Right hand toolholder with left hand insert shown



2 Left hand toolholder with right hand insert shown

A/E-SDZXR/L

Screw-on boring bar, for DXGQ/U inserts



Inch	Material	DMIN	DCONMS	WF	LF	LH	L3	H	f2	GAMP	GAMF	RE**	Insert	Torque*
A08-SDZXR/L2-D10	Steel	0.625	0.500	0.438	5	1.125	0.500	0.475	0.188	-10.0	-14.0	0.0160	DXGQ/U22**L/R...	0.66
A10-SDZXR/L2-D11	Steel	0.688	0.625	0.500	7	1.250	0.500	0.600	0.188	-10.0	-12.5	0.0160	DXGQ/U22**L/R...	0.66
A12-SDZXR/L2-D14	Steel	0.875	0.750	0.563	7	1.375	0.500	0.725	0.188	-10.0	-10.5	0.0160	DXGQ/U22**L/R...	0.66

Metric	Material	DMIN	DCONMS	WF	LF	LH	L3	H	f2	GAMP	GAMF	RE**	Insert	Torque*
A12M-SDZXR/L07-D140	Steel	14	12	10.5	150	30	13	11	4.5	-10.0	-14.0	0.40	DXGQ/U0703**L/R...	0.9
A16Q-SDZXR/L07-D160	Steel	16	16	12.5	180	35	13	15	4.5	-10.0	-12.50	0.40	DXGQ/U0703**L/R...	0.9
A20R-SDZXR/L07-D200	Steel	20	20	14.5	200	40	13	18	4.5	-10.0	-10.5	0.40	DXGQ/U0703**L/R...	0.9
E12Q-SDZXR/L07-D180	Carbide	18	12	10.5	180		13	11	4.5	-11.0	-11.0	0.40	DXGQ/U0703**L/R...	0.9
E16R-SDZXR/L07-D220	Carbide	22	16	12.5	200		13	15	4.5	-11.0	-9.0	0.40	DXGQ/U0703**L/R...	0.9

*Torque: Recommended torque (lb-ft) for clamping **RE: The holder measurements are true with this insert radius
Note: Use right-hand toolholders (R) with right-hand inserts (R); and left-hand toolholders (L) with left-hand inserts (L).

SPARE PARTS

Designation	Clamping screw	Wrench
A/E**-SDZXR/L...	SR34-514	T-7F

- 1 Right hand toolholders (R) are used with right hand inserts (R)
- 2 Left hand toolholders (L) are used with left hand inserts (L)

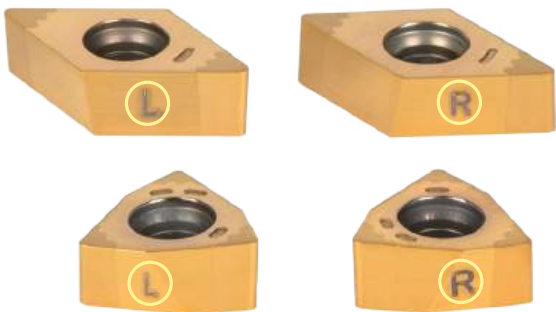


- 1 Right hand toolholder with right hand insert shown



- 2 Left hand toolholder with left hand insert shown

MARKING



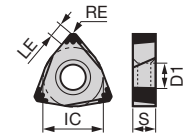
Insert hand is identified on the flank side

Insert POSITIVE TYPE

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

WX

80° Trigon with hole



IC : 0.250"
D1 : 0.106"
S : 0.125"

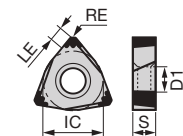
[illegible]

● : Line up

WX with chipbreaker



80° Trigon with hole



IC : 0.250"
D1 : 0.106"
S : 0.125"

[illegible]

● : Line up

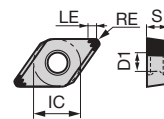
Insert POSITIVE TYPE

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

DX



55° Rhombic with hole



IC : 0.250"
D1 : 0.106"
S : 0.125"

New

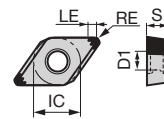
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● : New product

DX with chipbreaker



55° Rhombic with hole



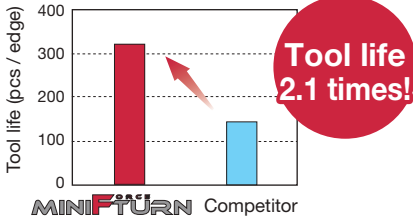
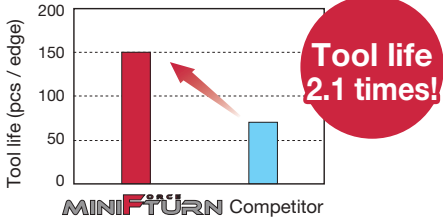
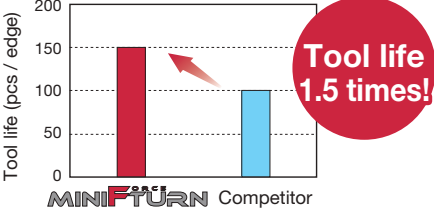
IC : 0.250"
D1 : 0.106"
S : 0.125"

New

[illegible]

● : New product

PRACTICAL EXAMPLES

Workpiece type		Driven gear	Machine part
Insert		New 4QS-DXGQ 221SPL	6QS-WXGQ 221SPL
Grade		BXA10	BXA20
Workpiece material		SCM420 / 18CrMo4 (50HRC)	SCM415 / 15CrMo4 (60HRC)
		 H	 H
Cutting conditions	Cutting speed: V_c (sfm)	853	295
	Feed : f (ipr)	0.0024	0.0024
	Depth of cut : ap (inch)	0.0059	0.0030
	Coolant	Wet	Dry
Results		 MiniForce-Turn provided better cutting edge integrity and more rigid insert clamping, compared with ISO positive inserts, achieving 2.1 times tool life increase.	 Strong cutting edge design of MiniForce-Turn insert provided fracture resistance, prolonging tool life by 2.1 times over the competitor's positive insert.
Workpiece type		Gear part	
Insert		6QS-WXGQ 221SPL	
Grade		BXA10	
Workpiece material		SCM420 / 18CrMo4 (60HRC)	
		 H	
Cutting conditions	Cutting speed: V_c (sfm)	230	
	Feed : f (ipr)	0.0012	
	Depth of cut : ap (inch)	0.0039	
	Coolant	Dry	
Results		 MiniForce-Turn insert provided 1.5 times longer tool life over competitor's positive insert, while also eliminated chatter during machining.	

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