

 TurnLine

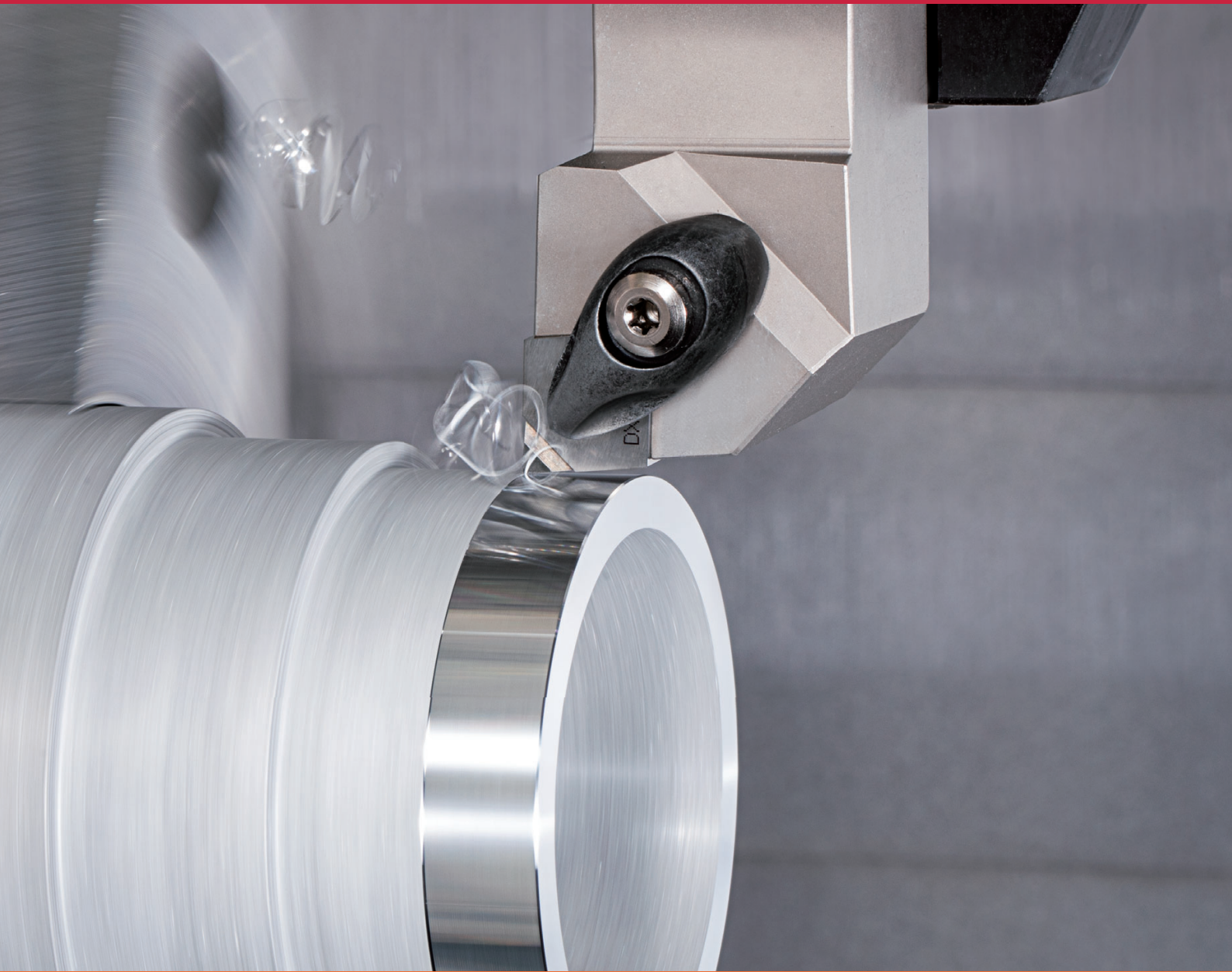
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T-DIA SERIES

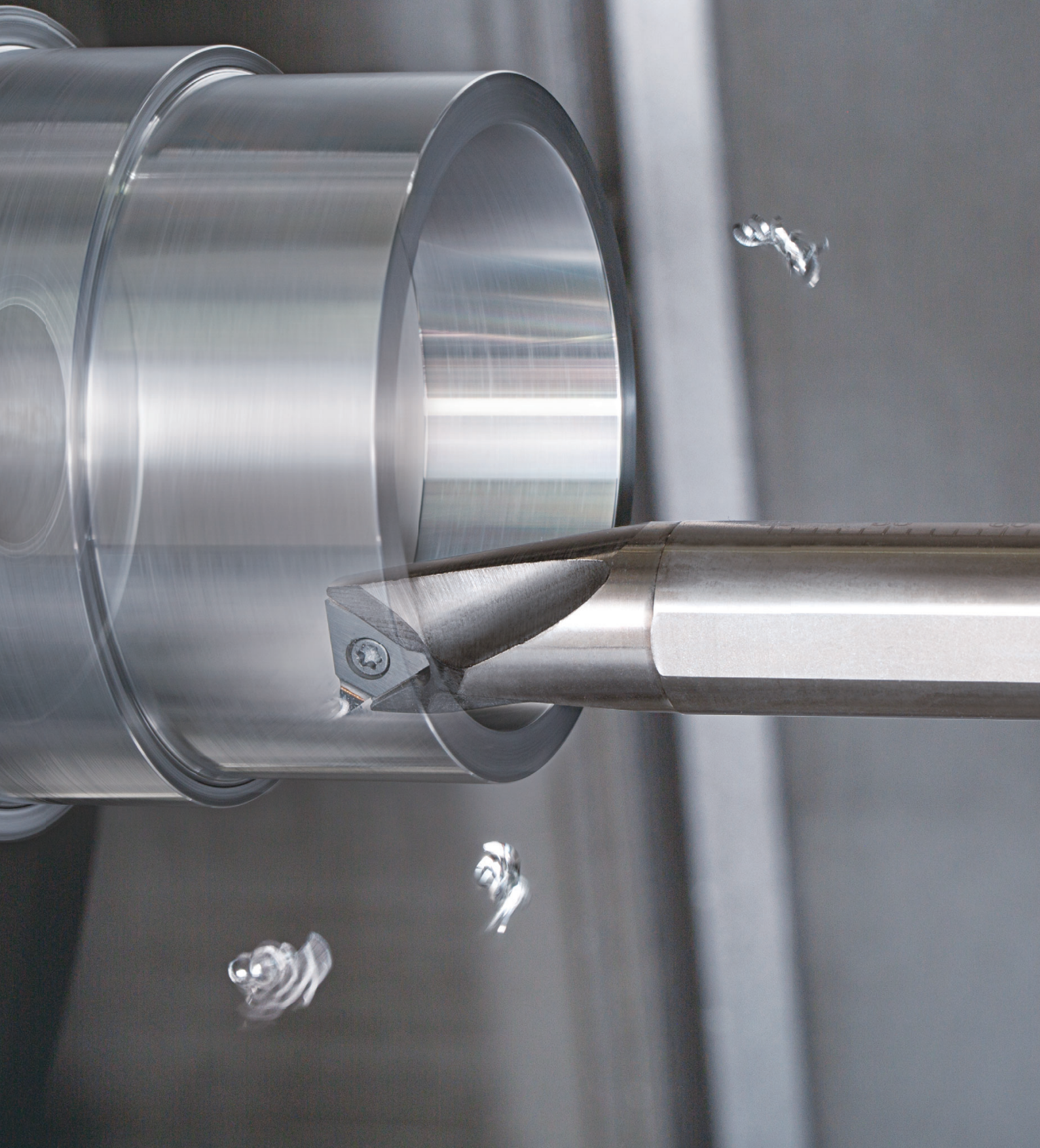
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Tungaloy Report No. 351-G

Now offers DX110-sub-micron
grain PCD grade inserts



INDUSTRY 4.0
FEED the SPEED!



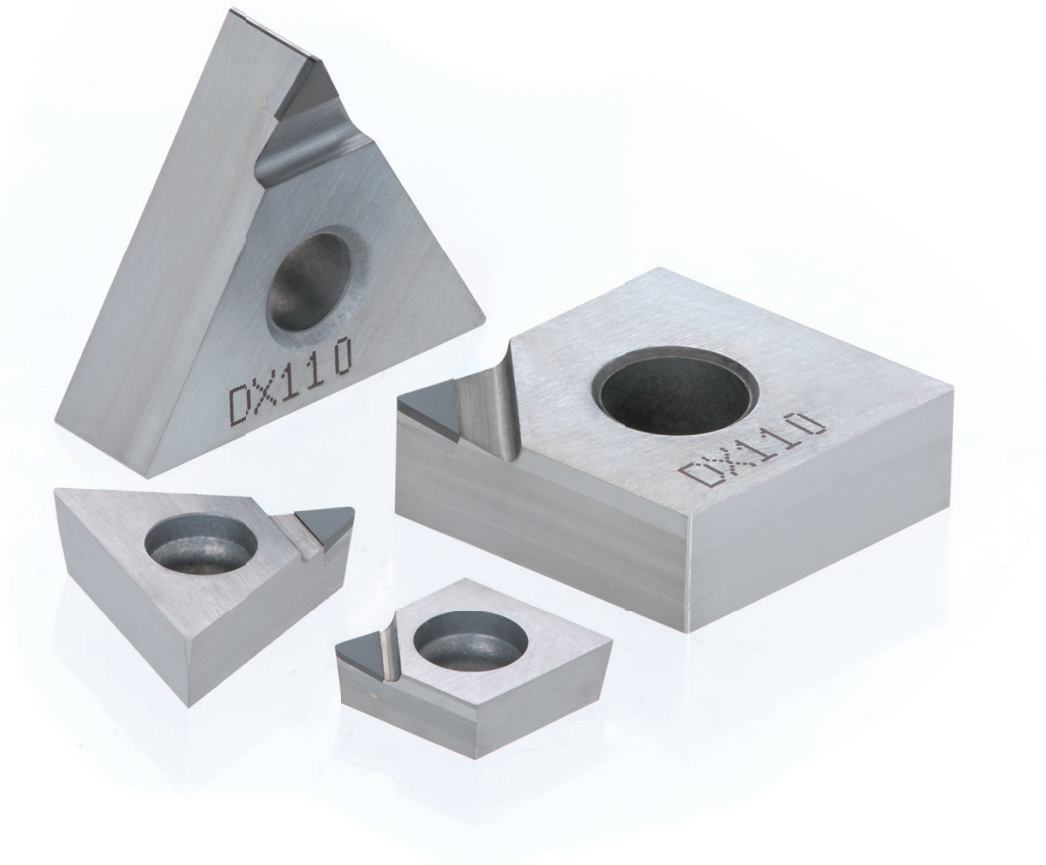
ACCELERATED MACHINING



TurnLine

T-DIA SERIES

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The ultimate solution for high speed machining of aluminum alloys

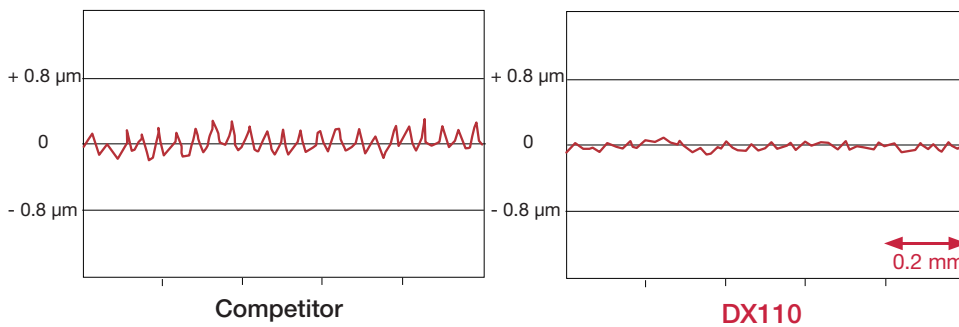
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Now offering **DX110** grade-ultra-fine grain polycrystalline diamond grade

Features of DX110

Submicron grain sized PCD structure allows the insert's cutting edge to retain extreme sharpness. Its strong PCD grain bond significantly reduces the drop-off of the abrasive grains during machining, making the grade exceptionally wear resistant.

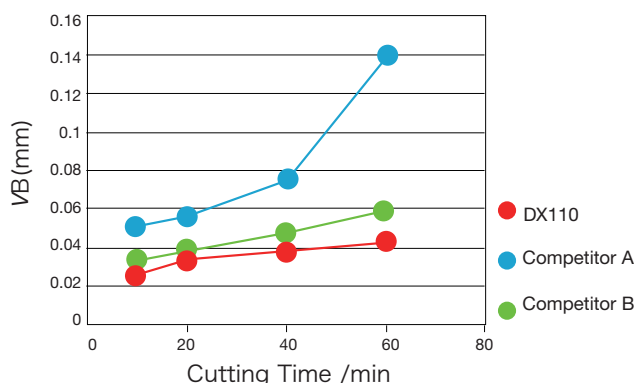
Surface finish



Insert : 1QP-DCGT11T308-NS DX110
 Material : Aluminum alloy (Si:10%)
 Cutting speed : $V_c = 500$ m/min
 Depth of cut : $a_p = 0.3$ mm
 Feed : $f = 0.05$ mm/rev

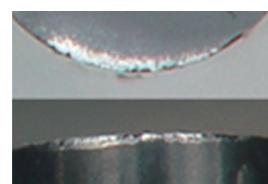
Submicron grain PCD grade DX110 insert with optimized rake angle provides excellent surface finish

Wear resistance



Insert : 1QP-CNMM120404 DX110
 Material : Aluminum alloy (Si:17%)
 Holder : ACLNL2525M12-A
 Cutting speed : $V_c = 500$ m/min
 Feed : $f_z = 0.1$ mm/rev
 Depth of cut : $a_p = 0.5$ mm
 Coolant : Dry

After 60 min



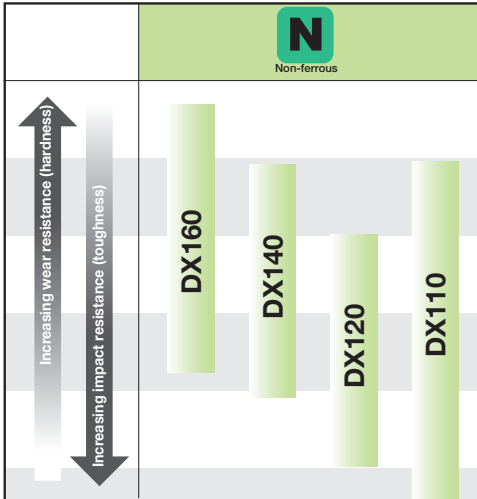
DX110



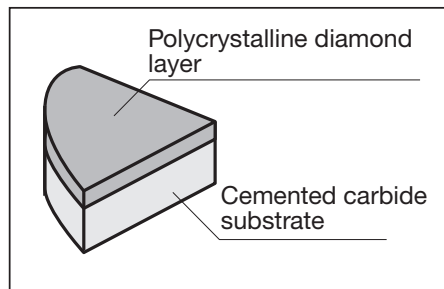
Competitor A

DX110 exhibited excellent wear resistance in machining extremely abrasive Si-Al alloy

Grades



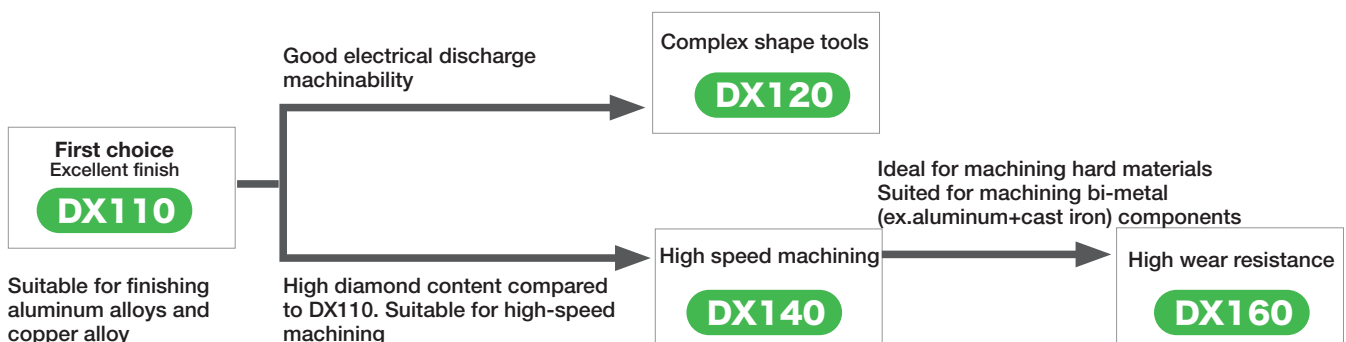
Diamond is the hardest known material on the earth. This is an advanced diamond based tool material where tiny diamond crystals are tightly sintered on the cemented carbide alloy base by means of a super high pressure and temperature process. PCD is therefore the optimum choice for cutting non-ferrous and non-metal materials.



Structure of T-DIA



Application	Grades	Microstructure	Grain size (µm)	Hardness (Hv)	Strength (GPa)	Features
	DX110		< 1	8500	1.8	Super fine grain T-DIA grade for superior surface finish. Excels in cutting edge sharpness and produces consistent high quality surface finish
	DX120		4.5	9000	1.8	High electrical conductivity. Excellent in wire electrical discharge machinability. Suitable for complex cutting edge shape tools
	DX140		12.5	10000	1.7	Medium grain diamond grade. High thermal conductivity, suitable for high-speed processing of Al alloy
	DX160		28	11000	1.6	High diamond content grade. Excellent wear resistance. Suitable for cutting ceramic and cemented carbide

Grade selection guide





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

PCD insert

NEGATIVE TYPE		P	M	K	N	S	H	PCD length					Corner radius					
Square, 90° with hole		Steel	Stainless	Cast iron	Non-ferrous	Superalloys	Hard materials	LE	RE	IC	S	D1	RE	Sharp edge				
Insert shape	Designation	DX140						Edge/insert	LE	RE	IC	S	D1	Sharp edge				
	SNGA** -DIA	SNGA120404 -DIA	●					1	3.6	0.4	12.7	4.76	5.16	○				
		SNGA120408 -DIA	●					1	3.6	0.8	12.7	4.76	5.16	○				
																		

● : Line-up

NEGATIVE TYPE		P	M	K	N	S	H	PCD length					Corner radius					
Square, 90° without hole		Steel	Stainless	Cast iron	Non-ferrous	Superalloys	Hard materials	LE	RE	IC	S	D1	RE	Sharp edge				
Insert shape	Designation	DX140						Edge/insert	LE	RE	IC	S	D1	Sharp edge				
	SNGN** -DIA	SNGN120408 -DIA	●					1	3.6	0.8	12.7	4.76						
																		

● : Line-up

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

PCD insert

POSITIVE TYPE		P	M	K	N	S	H											PCD length		Corner radius									
Rhombic, 80° with hole Positive 7°	Steel																						LE	RE					
	Stainless																												
	Cast iron																												
	Non-ferrous																												
	Superalloys																												
	Hard materials																												
Insert shape	Designation	DX110	DX120	DX140	DX160	Dimension (mm)					Edge prep			Rake angle															
						Edge/insert	LE	RE	IC	S	D1	Sharp edge																	
	CCGW**-DIA CCGW060200-DIA			●			1	2.4	0.05	6.35	2.38	2.8	○																
	CCGW060202-DIA			●			1	2.4	0.2	6.35	2.38	2.8	○																
	CCGW060204-DIA			●			1	2.4	0.4	6.35	2.38	2.8	○																
	CCGW09T302-DIA			●			1	3.5	0.2	9.525	3.97	4.4	○																
	CCGW09T304-DIA			●	●		1	3.5	0.4	9.525	3.97	4.4	○																
	CCGW09T308-DIA			●			1	3.4	0.8	9.525	3.97	4.4	○																
CCMT**-DIA	CCMT060202-DIA		●				1	2.4	0.2	6.35	2.38	2.8	○																
	CCMT060204-DIA		●				1	2.4	0.4	6.35	2.38	2.8	○																
	CCMT09T302-DIA		●				1	2.4	0.2	9.525	3.97	4.4	○																
	CCMT09T304-DIA		●				1	2.4	0.4	9.525	3.97	4.4	○																
	1QP-CCMT060204	★					1	2.4	0.4	6.35	2.38	2.8	○																
	1QP-CCMT09T304	★					1	2.4	0.4	6.35	3.97	4.4	○																


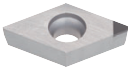
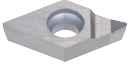
● : Line-up
★ : New product

POSITIVE TYPE		P	M	K	N	S	H											PCD length		Corner radius										
Rhombic, 80° with hole Positive 11°	Steel																									LE	RE			
	Stainless																													
	Cast iron																													
	Non-ferrous																													
	Superalloys																													
	Hard materials																													
Insert shape	Designation	DX140	Dimension (mm)					Edge prep			Rake angle																			
			Edge/insert	LE	RE	IC	S	D1	Sharp edge																					
	CPGA**-DIA CPGA090202-DIA		●				1	2.4	0.2	9.525	2.38	4.0	○																	
	CPGA090204-DIA		●				1	2.4	0.4	9.525	2.38	4.0	○																	



● : Line-up

PCD insert

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

POSITIVE TYPE		P	Steel	M	Stainless	K	Cast iron	N	Non-ferrous	S	Superalloys	H	Hard materials	PCD length		Corner radius							
	Rhombic, 55° with hole							●●	●●					LE	RE	LE	RE						
	Positive 7°																						
Insert shape	Designation	DX120	DX140	Dimension (mm)						Edge prep			Rake angle										
				Edge/insert	LE	RE	IC	S	D1	Sharp edge													
	DCGW**-DIA DCGW070200-DIA		●											1	2.4	0.05	6.35	2.38	2.8	○			
	DCGW070202-DIA	●	●											1	2.3	0.2	6.35	2.38	2.8	○			
	DCGW070204-DIA		●											1	2.1	0.4	6.35	2.38	2.8	○			
	DCGW11T302-DIA		●											1	3.2	0.2	9.525	3.97	4.4	○			
	DCGW11T304-DIA		●											1	3.0	0.4	9.525	3.97	4.4	○			
	DCGW11T308-DIA		●											1	2.7	0.8	9.525	3.97	4.4	○			
	DCMT**-DIA DCMT070202-DIA	●												1	2.3	0.2	6.35	2.38	2.8	○			○
	DCMT070204-DIA	●												1	2.1	0.4	6.35	2.38	2.8	○			○
	DCMT11T302-DIA	●												1	3.2	0.2	9.525	3.97	4.4	○			○
	DCMT11T304-DIA	●												1	3.0	0.4	9.525	3.97	4.4	○			○


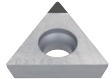
● : Line-up

POSITIVE TYPE		P	Steel	M	Stainless	K	Cast iron	N	Non-ferrous	S	Superalloys	H	Hard materials	PCD length		Corner radius							
	Rhombic, 75° with hole							●	●					LE	RE	LE	RE						
	Positive 11°																						
Insert shape	Designation	DX140	Dimension (mm)						Edge prep			Rake angle											
			Edge/insert	LE	RE	IC	S	D1	Sharp edge														
	EPGW**-DIA EPGW040102-DIA	●												1	2.0	0.2	3.97	1.59	2.3	○			
	EPGW040104-DIA	●												1	1.9	0.4	3.97	1.59	2.3	○			




● : Line-up

PCD insert

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

POSITIVE TYPE		P	Steel	M	Stainless	K	Cast iron	N	Non-ferrous	S	Superalloys	H	Hard materials			
 <p>Triangular, 60° with hole Positive 11°</p>								●●●●								
Insert shape	Designation	DX120	DX140	Dimension (mm)					Edge prep							
				Edge/insert	LE	RE	IC	S	D1	Sharp edge						
	TPGW**-DIA TPGW080202-DIA		●													
	TPGW080204-DIA		●													
	TPGW090202-DIA	●	●													
	TPGW090204-DIA		●													
	TPGW110202-DIA	●	●													
	TPGW110204-DIA		●													
	TPGW130302-DIA	●	●													
	TPGW130304-DIA		●													
	TPGW16T302-DIA		●													
	TPGW16T304-DIA		●													
TPGW16T308-DIA		●														

● : Line-up

POSITIVE TYPE		P	Steel	M	Stainless	K	Cast iron	N	Non-ferrous	S	Superalloys	H	Hard materials		
 <p>Rhombic, 35° with hole Positive 7°</p>								●●●●							
Insert shape	Designation	DX120	DX140	Dimension (mm)					Edge prep		Rake angle				
				Edge/insert	LE	RE	IC	S	D1	Sharp edge					
	VCGW**-DIA VCGW160402-DIA		●												
	VCGW160404-DIA		●												
	VCMT**-DIA VCMT160402-DIA	●												○	
	VCMT160404-DIA	●												○	


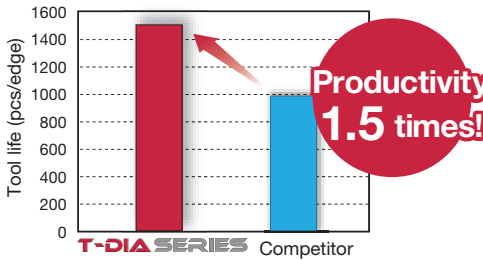
● : Line-up

Standard cutting conditions

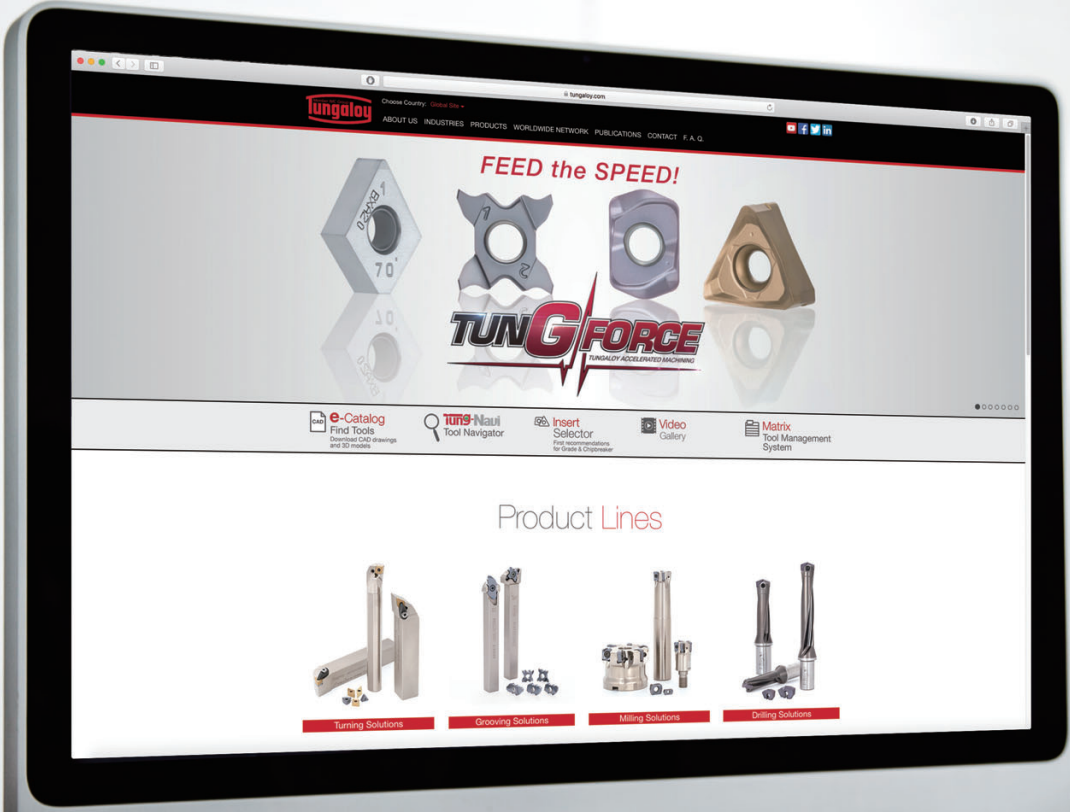
Work material	Cutting speed Vc (m/min)	Depth of cut ap (mm)	Feed f (mm/rev)	Grade selection			
				DX110	DX120	DX140	DX160
Aluminum alloys (Si < 12%)	1500 (1000-2500)	0.5 (0.05-2.0)	0.1 (0.05-0.2)	◎	○	○	
Aluminum alloys (Si ≥ 12%)	600 (400-800)	0.5 (0.05-2.0)	0.1 (0.05-0.2)	◎	○	○	○
Copper and Brass	800 (500-1500)	0.5 (0.05-2.0)	0.1 (0.05-0.2)	◎	○		
Bronze	400 (300-500)	0.5 (0.05-2.0)	0.1 (0.05-0.2)	◎	○	○	
Carbon / Graphite	400 (300-500)	0.5 (0.05-2.0)	0.1 (0.05-0.2)		○	○	◎
FRP	700 (500-1000)	0.2 (0.05-0.5)	0.05 (0.03-0.1)		○	○	◎
Plastic	700 (500-1000)	0.2 (0.05-0.5)	0.03 (0.01-0.05)	◎	○	○	
Cemented carbide (D40 - D50)	15 (10-20)	0.1 (0.05-0.2)	0.03 (0.01-0.05)			○	◎
Green ceramics	130 (100-150)	0.5 (0.05-2.0)	0.05 (0.03-0.1)			○	◎

◎ : First choice ○ : Second choice

PRACTICAL EXAMPLES

Workpiece type		Copper-based sintered alloy
Insert		1QP-CCMT09T304, 1QP-CCMT32.51
Grade		DX110
Workpiece		
Cutting conditions	Cutting speed: Vc (m/min)	300
	Feed : f (mm/rev)	0.05
	Depth of cut : ap (mm)	0.1
	Coolant	Water soluble
Results		 <p>Thanks to its optimized rake angle and sharp cutting edge, DX110 eliminated burr formation on the machined surface, while extending tool life by 1.5x over the competitor's.</p>

Check our site and our App to get more info!



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.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.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.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.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.es

Tungaloy Scandinavia AB

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

Tungaloy Rus, LLC

115432, Moscow, Andropov Avenue, 18,
building 7, 11th floor (office 3). Metro station
"Technopark". Business center «I-Land».
Phone: +7-499-683-01-80/81
www.tungaloy.com/ru

Tungaloy Polska Sp. z o.o.

ul. Genewska 24
03-963 Warszawa, Poland
Phone: +48-22-617-0890
Fax: +48-22-617-0890
www.tungaloy.com/pl

Tungaloy U.K. Ltd

The Technology Centre,
Wolverhampton Science Park
Glaisher Drive, Wolverhampton
West Midlands WV10 9RU, UK
Phone: +44 121 4000 231
Fax: +44 121 270 9694
www.tungaloy.com/uk
salesinfo@tungaloyuk.co.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
info@tungaloytools.hu

Tungaloy Turkey

Dudullu OSB 4. Cad No:4
34776 Umraniye Istanbul, TURKEY
Phone: +90 216 540 04 67
Fax: +90 216 540 04 87
www.tungaloy.com.tr
info@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-benelux.com

Tungaloy Croatia

Ulica bana Josipa Jelačića 87,
10430 Samobor
Phone: +385 1 3326 604
Fax: +385 1 3327 683
www.tungaloy.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 Tool (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.co.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/sg

Tungaloy Vietnam

LE 04-38, Lexington Residence
67 Mai Chi Tho, Dist. 2,
Ho Chi Minh City, Vietnam
Phone: +84-8-37406660
Fax: +84-8-37406662
www.tungaloy.com/sg

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

PO Box 2232, 68/1470
Ferntree Gully Road, Knoxfield
Victoria 3180, 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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