



Turning tool

Non-Ferrous Application Series

Tungaloy Report No. 555S3-G

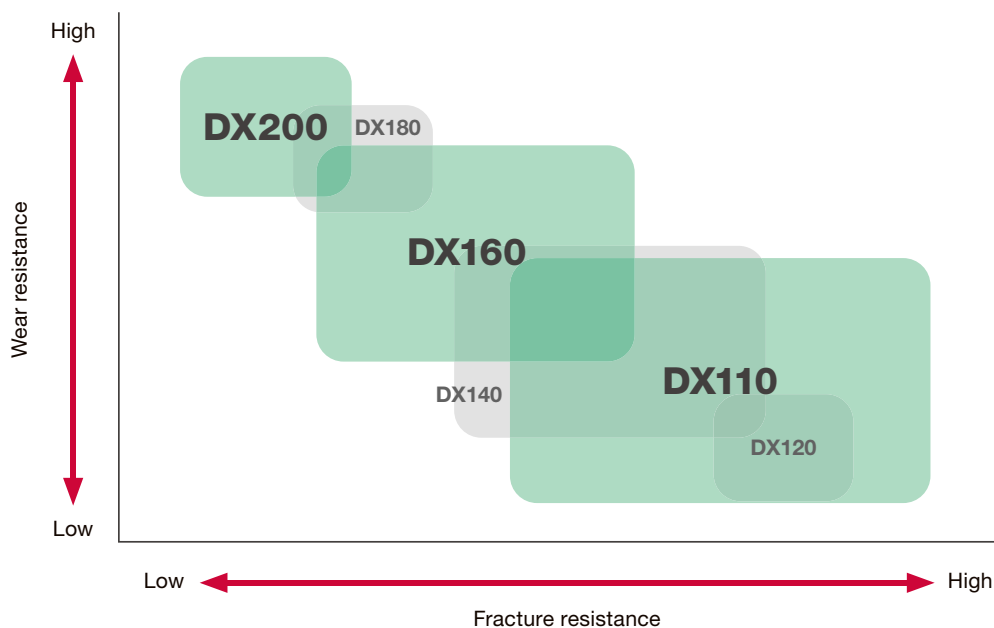
Expansion of DX160 high diamond-content PCD grade insert line



Non-Ferrous Application Series

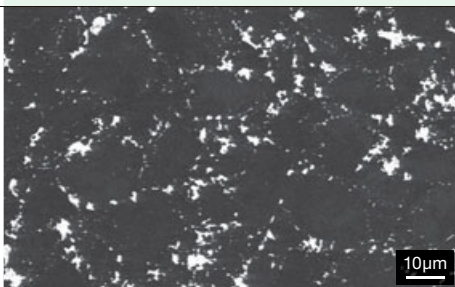
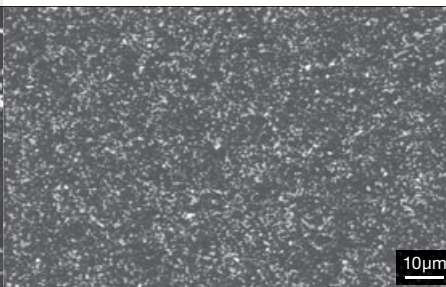
DX160 — Superior cutting-edge integrity and high wear-resisting properties

PCD grades and applications



High diamond-content PCD grade for superior wear resistance

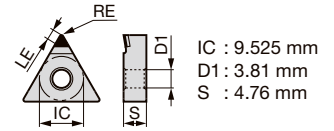
- A coarse diamond grain grade, **DX160** contains a high volume percent of diamond, which exceeds the fine-grained DX110, for superior wear resistance.
- Suited for various non-ferrous applications including a wide range of Aluminium and Copper alloys, as well as hard, brittle materials such as Tungsten.

Grade	DX160	DX110
Microstructure		
Grain size (µm)	28	< 1
Hardness (Hv)	11,000	8,500
Application	High wear resistance	High fracture resistance

TN



Triangular with hole



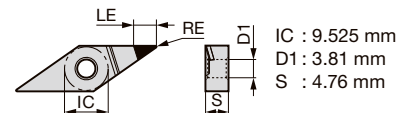
Application	Designation	Dimension (mm)			No. of corners	Chipbreaker															
		RE	LE				DX160														
Finishing	1QP-TNMM160402F	0.2	2.6	1		●															
	1QP-TNMM160404F	0.4	2.4	1		●															
	1QP-TNMM160408F	0.8	2.1	1		●															

● : Line up

VN



35° Rhombic with hole



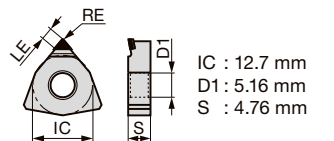
Application	Designation	Dimension (mm)			No. of corners	Chipbreaker															
		RE	LE				DX160														
Finishing	1QP-VNMM160402F	0.2	2.5	1		●															
	1QP-VNMM160404F	0.4	2.3	1		●															
	1QP-VNMM160408F	0.8	2.1	1		●															
	1QP-VNMM160412F	1.2	2.1	1		●															

● : Line up

WN



80° Trigon with hole



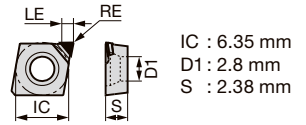
Application	Designation	Dimension (mm)			No. of corners	Chipbreaker															
		RE	LE				DX160														
Finishing	1QP-WNMM080402F	0.2	2.6	1		●															
	1QP-WNMM080404F	0.4	2.6	1		●															

● : Line up

PCD Insert POSITIVE TYPE

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

CC



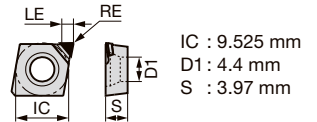
**80° Rhombic
Positive 7°
with hole**

		N Non-ferrous		●●											
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Application	Designation	Dimension (mm)		No. of corners	Chipbreaker										
		RE	LE			DX160									
Finishing	1QP-CCMT060202F	0.2	2	1	●										
	1QP-CCMT060204F	0.4	2.1	1	●										

● : Line up

CC



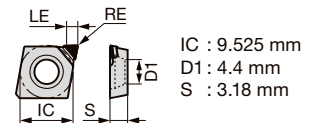
**80° Rhombic
Positive 7°
with hole**

		N Non-ferrous		●●											
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Application	Designation	Dimension (mm)		No. of corners	Chipbreaker										
		RE	LE			DX160									
Finishing	1QP-CCMT09T302F	0.2	2.1	1	●										
	1QP-CCMT09T304F	0.4	2.1	1	●										
	1QP-CCMT09T308F	0.8	2	1	●										

● : Line up

CP



**80° Rhombic
Positive 11°
with hole**

		N Non-ferrous		●●											
--	--	---------------	--	----	--	--	--	--	--	--	--	--	--	--	--

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker										
		RE	LE			DX160									
Finishing	1QP-CPMT090302F	0.2	2	1	●										
	1QP-CPMT090304F	0.4	2	1	●										
	1QP-CPMT090308F	0.8	1.9	1	●										

● : Line up

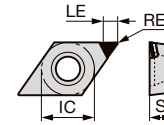
PCD Insert POSITIVE TYPE

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

DC



**55° Rhombic
Positive 7°
with hole**



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

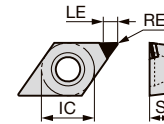
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker															
		RE	LE			DX160														
Finishing	1QP-DCMT070202F	0.2	2.5	1		●														
	1QP-DCMT070204F	0.4	2.5	1		●														

● : Line up

DC



**55° Rhombic
Positive 7°
with hole**



IC : 9.525 mm
D1 : 4.4 mm
S : 3.97 mm

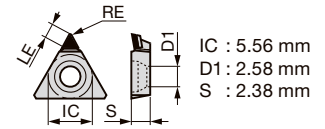
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker															
		RE	LE			DX160														
Finishing	1QP-DCMT11T302F	0.2	2.6	1		●														
	1QP-DCMT11T304F	0.4	2.4	1		●														
	1QP-DCMT11T308F	0.8	2.4	1		●														

● : Line up

TP



Triangular Positive 11° with hole



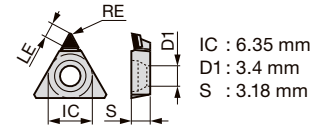
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX160															
Finishing	1QP-TPMT090202F	0.2	1.8	1		●															
	1QP-TPMT090204F	0.4	1.7	1		●															

● : Line up

TP



Triangular Positive 11° with hole



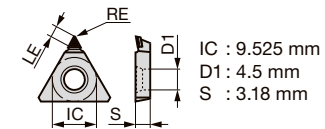
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX160															
Finishing	1QP-TPMT110302F	0.2	2.3	1		●															
	1QP-TPMT110304F	0.4	2.2	1		●															

● : Line up

TP



Triangular Positive 11° with hole



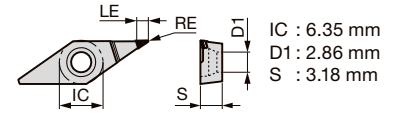
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX160															
Finishing	1QP-TPMH160302F	0.2	2.4	1		●															
	1QP-TPMH160304F	0.4	2.3	1		●															

● : Line up

VB



**35° Rhombic
 Positive 5°
 with hole**



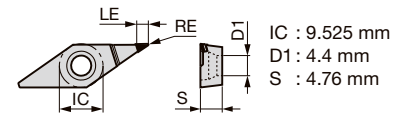
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX160														
		RE	LE																	
Finishing	1QP-VBMT110302F	0.2	2.5	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	1QP-VBMT110304F	0.4	2.3	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	1QP-VBMT110308F	0.8	2.1	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● : Line up

VB



**35° Rhombic
 Positive 5°
 with hole**



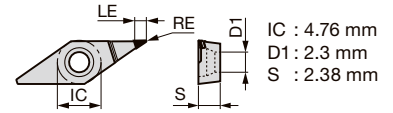
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX160															
		RE	LE																		
Finishing	1QP-VBMT160402F	0.2	2.5	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	1QP-VBMT160404F	0.4	2.3	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	1QP-VBMT160408F	0.8	2.1	1		●c	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● : Line up

VC



35° Rhombic Positive 7° with hole



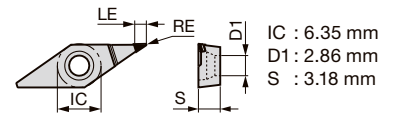
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX160															
		RE	LE																		
Finishing	1QP-VCMT080202F	0.2	2.5	1		●●															
	1QP-VCMT080204F	0.4	2.3	1		●●															
	1QP-VCMT080208F	0.8	2.1	1		●●															

● : Line up

VC



35° Rhombic Positive 7° with hole



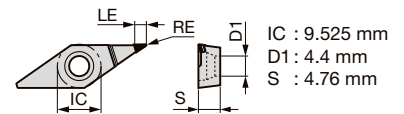
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX160															
		RE	LE																		
Finishing	1QP-VCMT110302F	0.2	2.5	1		●●															
	1QP-VCMT110304F	0.4	2.3	1		●●															

● : Line up

VC



35° Rhombic Positive 7° with hole




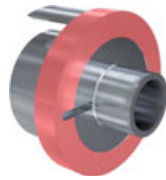
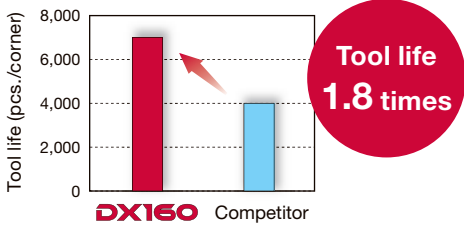
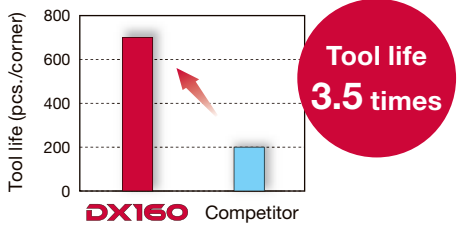
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX160															
		RE	LE																		
Finishing	1QP-VCMT160402F	0.2	2.5	1		●●															
	1QP-VCMT160404F	0.4	2.3	1		●●															
	1QP-VCMT160408F	0.8	2.1	1		●●															
	1QP-VCMT160412F	1.2	2.1	1		●●															

● : Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Grade	Cutting speed V_c (m/min)	Feed f (mm/rev)	Depth of cut a_p (mm)
N	Aluminium alloys (Si < 12%)	DX160	300 - 2500	0.05 - 0.2	0.05 - 1
	Aluminium alloys (Si ≥ 12%)	DX160	400 - 800	0.05 - 0.2	0.05 - 1
	Magnesium alloys	DX160	400 - 1200	0.05 - 0.2	0.05 - 1
	Copper and its alloys (brass, bronze)	DX160	500 - 1500	0.05 - 0.2	0.05 - 1
	FRP	DX160	500 - 1000	0.05 - 0.3	0.1 - 1
	CFRP	DX160	100 - 700	0.05 - 0.3	0.1 - 1
	Carbon	DX160	300 - 500	0.05 - 0.3	0.1 - 1
	Green ceramics	DX160	100 - 200	0.02 - 0.1	0.1 - 1
	Tungsten carbide (HRA80 - 95)	DX160	5 - 30	0.02 - 0.1	0.02 - 0.2

PRACTICAL EXAMPLES

Workpiece type		Stator	Scroll compressor component
Insert		1QP-VCMT110304F	1QP-DNMM150408F
Grade		DX160	DX160
Workpiece material		AlSi11Cu3(Fe)  N	Aluminium alloy  N
Cutting conditions	Cutting speed : V_c (m/min)	200	560
	Feed : f (mm/rev)	0.06	0.03
	Depth of cut : a_p (mm)	0.25	0.15
	Coolant	Wet	Wet
Results		 <p>Tool life 1.8 times</p> <p>A coarse diamond grain grade, DX160 provided better wear resistance over competitors' submicron PCD grades, achieving 1.8x tool life increase.</p>	 <p>Tool life 3.5 times</p> <p>Boasting a sharp and strong cutting edge that excelled competitors' submicron PCD grades, DX160 grade inserts provided 3.5x tool life increase during interrupted cuts without losing edge integrity.</p>

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