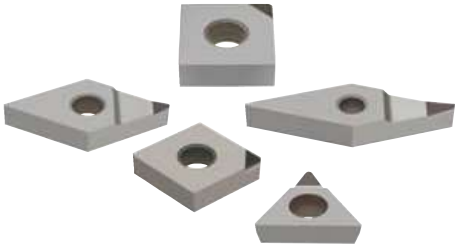
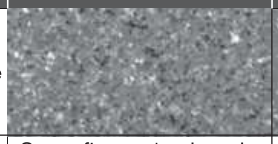
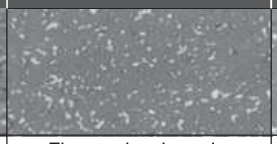
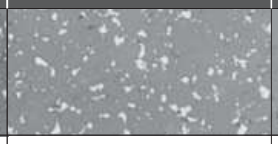
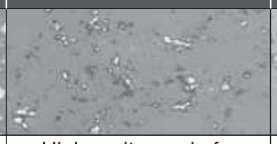
PCD grades

T-DIA series



Expanded product line allows T-DIA tools to be applied to wider work materials and cutting conditions.

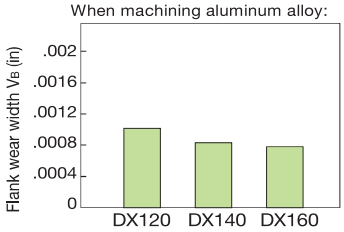
Features and applications (Physical and mechanical properties)

	DX110	DX120	DX140	DX160	DX180
Grade					
Property	Super fine grained grade. Excels in surface finish.	Fine grained grade. Excels in surface finish.	General purpose grade	High purity grade for hard materials	Highly wear resistant grade for special applications
Approx. grain size of diamond (μm)	< 1	4.5	12.5	28	45
Hardness (Hv)	6000 →				12000 (Harder)
Wear resistance	→				Higher
Grindability (Cutting edge sharpness)	Better ←				

Note: T-DIA grades are not suitable for ferrous materials (such as hardened steel, chilled cast iron), and Ni- or Co-base superalloys.

Cutting performance (Wear resistance)

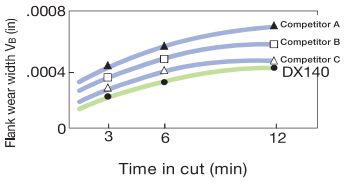
When machining aluminum alloy:



Continuous external turning

- Work material: 10 % Si, aluminum alloy
- Insert: SPGN 422-DIA
- Toolholder: CSBPR2525M4
- Cutting speed: v_c = 500 m/min
- Feed: f = .004 in/rev
- Depth of cut: a_p = .020 in
- Coolant: Dry cutting
- Time in cut: 30 min

When machining FRP:



Face milling

- Work material: Fiber reinforced plastics (FRP)
- Insert: SPCN42ZFR-DIA
- Milling cutter: TPG4208R-A
- Cutting speed: v_c = 3090 SFM
- Feed: f = .004 in/rev
- Depth of cut: a_p = .059 in
- Coolant: Dry cutting

Grade selection guide

DX140 Basic selection (General purpose grade)

- For precision machining
- When good surface finish is required.
- When interrupted cutting is involved.

→ **DX120** Excels in cutting-edge sharpness and impact resistance. → **DX110** Super fine grained grade

- When machining hard materials such as high silicon aluminum alloys (Si > 12 %)
- Simultaneous machining of aluminum alloy and cast iron.
- When high wear resistance is required.

→ **DX160** Superior wear resistance → **DX180** Special purpose grade

- When requiring higher wear resistance than DX160 (such as when machining high silicon materials, cemented carbides, semi-sintered ceramics, etc.)

Standard cutting conditions for turning

Work material	Cutting speed v_c (m/min)	Depth of cut a_p (in)	Feed f (in/rev)	Grade applicability				
				DX110	DX120	DX140	DX160	DX180
Aluminum alloys (Si < 12 %)	3300 - 8200	.002 - .078	.002 - .008	○	○	◎		
Aluminum alloys (Si > 12 %)	1300 - 2630	.002 - .078	.002 - .008			○	◎	
Copper, brass	1640 - 4920	.002 - .078	.002 - .008	○	○	◎		
Phosphor bronze	980 - 1640	.002 - .078	.002 - .008	○	○	◎		
Carbon, graphite	980 - 1640	.002 - .078	.002 - .008			◎		
FRP	1640 - 3300	.001 - .004	.001 - .004	○	◎	○		
Plastics	1640 - 3300	.001 - .004	.001 - .002	○	◎	○		
Cemented carbides (D40 ~ D60)	30 - 65	.001 - .002	.001 - .002				○	◎
Semi-sintered ceramics	330 - 500	.001 - .004	.001 - .004				○	◎

Note: ◎:First choice ○ : Second choice