

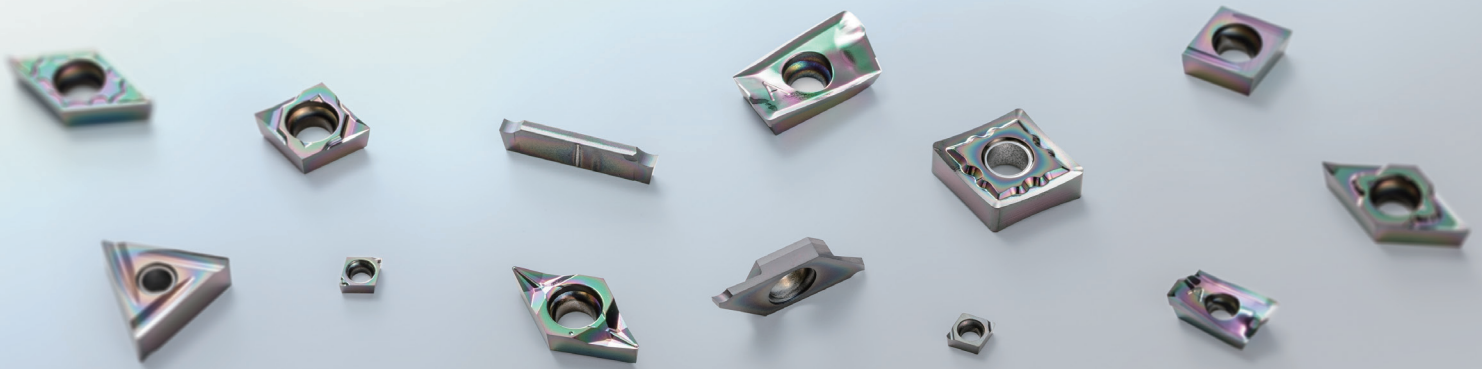
THE NEW VALUE FRONTIER



DLC Coating | **PDL025**

DLC Coating

PDL025



High Quality and Long Tool Life for Machining Aluminum

Achieves Long Tool Life with Hardness Close to that of Diamond

Excellent Surface Finish with Aluminum Welding Resistance

Large Lineup for Turning, Milling, and Cut-Off Operations



DLC Coating

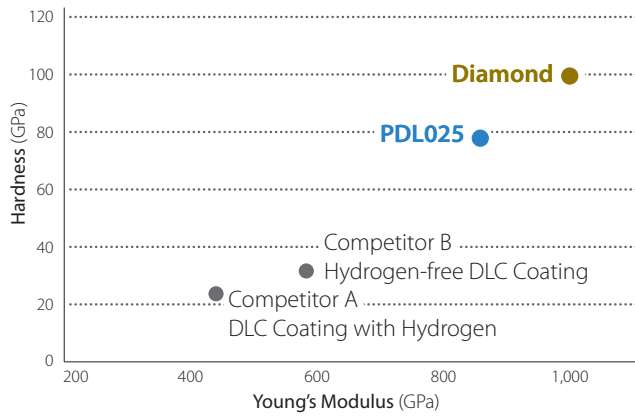
PDL025

Achieves Long Tool Life with Hardness Close to that of Diamond
Large Lineup for Turning, Milling, and Cut-Off Operations

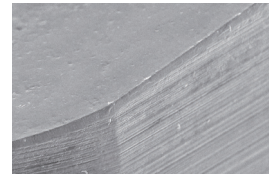
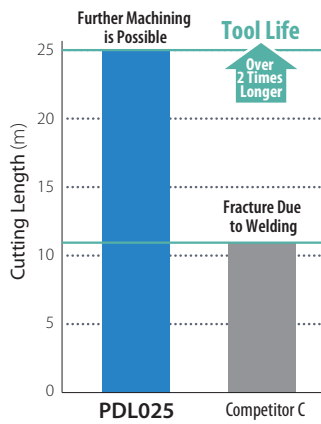
1 Long and Stable Tool Life

High Hardness with Kyocera's Proprietary Hydrogen-free DLC Coating

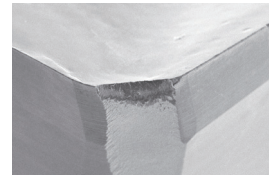
Coating Properties



Tool Life (In-house Evaluation)



PDL025 After Machining 25 m



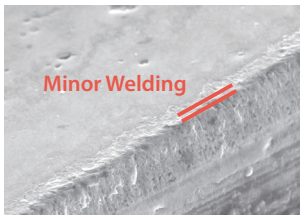
Competitor C After Machining 11 m

Cutting Conditions: $V_c = 500$ m/min, $f_z = 0.2$ mm/t, $a_p \times a_e = 3 \times 5$ mm, Dry
Cutter Dia. $\phi 25$ mm Workpiece: A7075

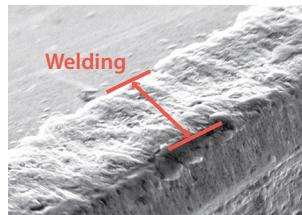
2 Excellent Surface Finish

Excellent Surface Finish with Aluminum Welding Resistance

Welding Resistance Comparison (In-house Evaluation)



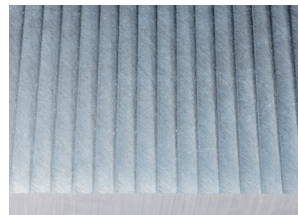
PDL025



Competitor D

Cutting Conditions: $V_c = 800$ m/min, $f_z = 0.1$ mm/t, $a_p \times a_e = 3 \times 5$ mm, Dry
Cutter Dia. $\phi 25$ mm Workpiece: A5052 Cutting Length: 57 m

Machined Surface Comparison (In-house Evaluation)



PDL025



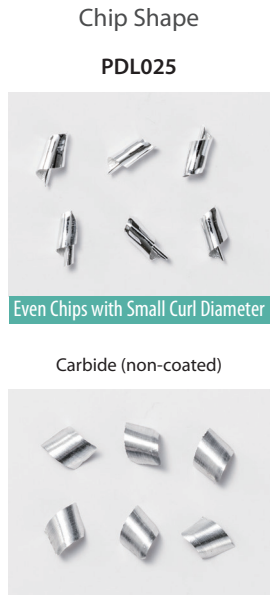
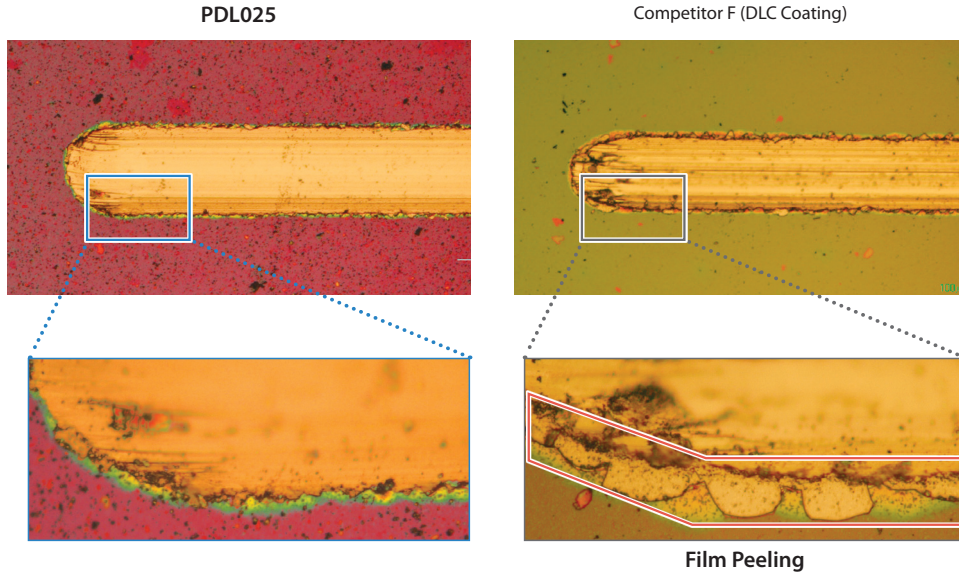
Competitor E

Cutting Conditions: $V_c = 800$ m/min, $f_z = 0.1$ mm/t, $a_p \times a_e = 3 \times 5$ mm, Dry
Cutter Dia. $\phi 25$ mm Workpiece: A6061
Cutting Length: PDL025 (48 m), Competitor E (14 m)

3 Stable Machining

Stable Machining Due to DLC Coating Layer with Excellent Peeling Resistance Improved Chip Evacuation Due to High Lubrication

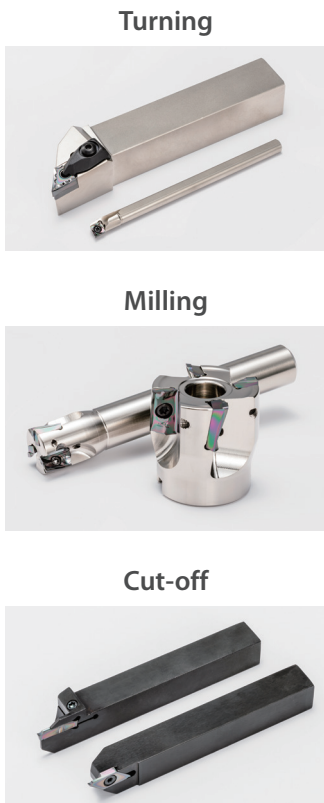
Scratch Test: Coating Conditions Comparison with Load 80 N (In-house Evaluation)



Cutting Conditions: $V_c = 800$ m/min, $f_z = 0.1$ mm/t,
 $a_p \times a_e = 3 \times 5$ mm, Dry Cutter Dia. 25 mm
Insert BDGT11T304FR-JA Workpiece: A5052

4 Large Tooling Lineup

Wide Range of Applications Including Turning, Milling, and Cut-off Operations



Case Study

Block A5052


















$V_c = 450$ m/min
 $f_z = 0.15$ mm/t
($V_f = 1,900$ mm/min)
 $a_p \times a_e = 2 \times \sim 80$ mm
Wet
MEC080R-11-7T (7-Flute)
BDGT11T308FR-JA PDL025















Number of Workpieces		Tool Life
PDL025	7 pcs/edge	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> 1.4 Times </div>
Competitor G (6-Flute)	5 pcs/edge	

PDL025 has less welding compared to Competitor G and tool life is improved by 1.4 times.
A good wall and surface finish is achieved.
(User Evaluation)

Standard Stock Items Description

Turning Inserts (Positive)






Shape	Description	Dimensions (mm)				Relief Angle	DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (re)		PDL 025	
 Minute Depth of Cut Sharp Edge / Mirror Surface Finish	CCGT 030101MP-CF	3.5	1.4	1.9	<0.1	7°	●	
	CCGT 030102MP-CF				<0.2		●	
 Sharp Edge / Mirror Surface Finish	CCGT 040101MP-CF	4.3	1.8	2.3	<0.1	7°	●	
	CCGT 040102MP-CF				<0.2		●	
 Finishing Sharp Edge / Mirror Surface Finish	CCGT 060201MFP-SK	6.35	2.38	2.8	<0.1	7°	●	
	CCGT 060202MFP-SK				<0.2		●	
	CCGT 060204MFP-SK				<0.4		●	
 Sharp Edge / Mirror Surface Finish	CCGT 09T301MFP-SK	9.525	3.97	4.4	<0.1	7°	●	
	CCGT 09T302MFP-SK				<0.2		●	
	CCGT 09T304MFP-SK				<0.4		●	
 Finishing Sharp Edge / Mirror Surface Finish	CCGT 060201MP-CK	6.35	2.38	2.8	<0.1	7°	●	
	CCGT 060202MP-CK				<0.2		●	
 Finishing-Medium Sharp Edge	CCGT 09T301MP-CK	9.525	3.97	4.4	<0.1	7°	●	
	CCGT 09T302MP-CK				<0.2		●	
 Finishing-Medium Sharp Edge	CCGT 09T304AH	9.525	3.97	4.4	0.4	7°	●	
	CCGT 09T308AH				0.8		●	
 Finishing-Medium Sharp Edge	CCGT 09T302 ^R /L-A3	9.525	3.97	4.4	0.2	7°	●	
	CCGT 09T304 ^R /L-A3				0.4		●	
	CCGT 09T308 ^R /L-A3				0.8		●	
 Sharp Edge	CCGT 120402 ^R /L-A3	12.7	4.76	5.5	0.2	7°	●	
	CCGT 120404 ^R /L-A3				0.4		●	
	CCGT 120408 ^R /L-A3				0.8		●	
 Finishing Sharp Edge	CCET 0301005ML-F	3.5	1.4	1.9	<0.05	7°	L	
	CCET 030101ML-F				<0.1		L	
	CCET 030102ML-F				<0.2		L	
	CCET 030104ML-F				<0.4		L	
 Sharp Edge	CCET 040101ML-F	4.3	1.8	2.3	<0.1	7°	L	
	CCET 040102ML-F				<0.2		L	
	CCET 040104ML-F				<0.4		L	
 Low Feed Sharp Edge	CCET 0602005MFR/L-U	6.35	2.38	2.8	<0.05	7°	●	
	CCET 060201MFR/L-U				<0.1		●	
	CCET 060202MFR/L-U				<0.2		●	
 Sharp Edge	CCET 09T3005MFR/L-U	9.525	3.97	4.4	<0.05	7°	●	
	CCET 09T301MFR/L-U				<0.1		●	
	CCET 09T302MFR/L-U				<0.2		●	
	CCET 09T304MFR/L-U				<0.4		●	
 Minute Depth of Cut Sharp Edge / Mirror Surface Finish	DCGT 070201MP-CF	6.35	2.38	2.8	<0.1	7°	●	
	DCGT 070202MP-CF				<0.2		●	
 Sharp Edge / Mirror Surface Finish	DCGT 11T301MP-CF	9.525	3.97	4.4	<0.1	7°	●	
	DCGT 11T302MP-CF				<0.2		●	
 Finishing Sharp Edge / Mirror Surface Finish	DCGT 070201MFP-SK	6.35	2.38	2.8	<0.1	7°	●	
	DCGT 070202MFP-SK				<0.2		●	
	DCGT 070204MFP-SK				<0.4		●	
 Sharp Edge / Mirror Surface Finish	DCGT 11T301MFP-SK	9.525	3.97	4.4	<0.1	7°	●	
	DCGT 11T302MFP-SK				<0.2		●	
	DCGT 11T304MFP-SK				<0.4		●	

Shape	Description	Dimensions (mm)				Relief Angle	DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (re)		PDL 025	
 Finishing Sharp Edge / Mirror Surface Finish	DCGT 070201MP-CK	6.35	2.38	2.8	<0.1	7°	●	
	DCGT 070202MP-CK				<0.2		●	
 Sharp Edge / Mirror Surface Finish	DCGT 11T301MP-CK	9.525	3.97	4.4	<0.1	7°	●	
	DCGT 11T302MP-CK				<0.2		●	
 Finishing-Medium Sharp Edge	DCGT 11T304AH	9.525	3.97	4.4	0.4	7°	●	
 Finishing-Medium Sharp Edge	DCGT 11T302 ^R /L-A3	9.525	3.97	4.4	0.2	7°	●	
	DCGT 11T304 ^R /L-A3				0.4		●	
	DCGT 11T308 ^R /L-A3				0.8		●	
 Finishing Sharp Edge	DCET 0702005MR-F	6.35	2.38	2.8	<0.05	7°	R	
	DCET 070201MR/L-F				<0.1		●	
	DCET 070202MR/L-F				<0.2		●	
	DCET 070204MR/L-F				<0.4		●	
 Sharp Edge	DCET 11T3005MR-F	9.525	3.97	4.4	<0.05	7°	R	
	DCET 11T301MR/L-F				<0.1		●	
	DCET 11T302MR/L-F				<0.2		●	
	DCET 11T304MR/L-F				<0.4		●	
 Low Feed Sharp Edge	DCET 0702005MFR-U	6.35	2.38	2.8	<0.05	7°	R	
	DCET 070201MFR/L-U				<0.1		●	
	DCET 070202MFR/L-U				<0.2		●	
 Sharp Edge	DCET 11T3005MFR-U	9.525	3.97	4.4	<0.05	7°	R	
	DCET 11T301MFR/L-U				<0.1		●	
	DCET 11T302MFR/L-U				<0.2		●	
	DCET 11T304MFR-U				<0.4		●	
 Finishing-Medium Sharp Edge	TCGT 110302 ^R /L-A3	6.35	3.18	2.8	0.2	7°	●	
	TCGT 110304 ^R /L-A3				0.4		●	
	TCGT 110308 ^R /L-A3				0.8		●	
 Minute Depth of Cut Sharp Edge / Mirror Surface Finish	VPGT 110301MP-CF	6.35	3.18	2.8	<0.1	11°	●	
	VPGT 110302MP-CF				<0.2		●	
 Finishing Sharp Edge / Mirror Surface Finish	VPGT 080201MP-CK	4.76	2.38	2.3	<0.1	11°	●	
	VPGT 080202MP-CK				<0.2		●	
 Finishing-Medium Sharp Edge	VPGT 110301MP-CK	6.35	3.18	2.8	<0.1	11°	●	
	VPGT 110302MP-CK				<0.2		●	
 Sharp Edge	VCGT 160404AH	9.525	4.76	4.4	0.4	7°	●	
 Finishing-Medium Sharp Edge	VCGT 160404 ^R /L-A3	9.525	4.76	4.4	0.4	7°	●	
	VCGT 160408 ^R /L-A3				0.8		●	






• Inserts with corner R (re) dimension shown with inequality sign (ex: <0.1) indicates minus tolerance of corner R (re).
 ● : Standard Stock
 R: R-hand Only in Stock
 L: L-hand Only in Stock

Standard Stock Items Description

Turning Inserts (Negative)

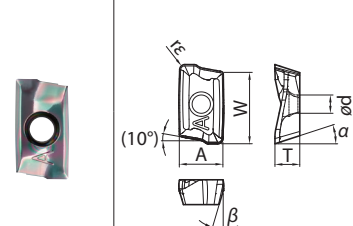
Shape	Description	Dimensions (mm)					DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (r _ε)	Relief Angle	PDL 025	
Medium-Roughing 	CNGG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●	
Finishing-Medium 	CNGG 120404R/L-A3 120408R/L-A3	12.70	4.76	5.16	0.4 0.8	0°	● ●	
Medium-Roughing 	CNMG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●	
Medium-Roughing 	DNGG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●	
Finishing-Medium 	DNGG 150404R/L-A3 150408R/L-A3	12.70	4.76	5.16	0.4 0.8	0°	● ●	

• Right-hand (R) is shown for inserts with angles.

Shape	Description	Dimensions (mm)					DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (r _ε)	Relief Angle	PDL 025	
Medium-Roughing 	DNMG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●	
Medium-Roughing 	TNGG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●	
Finishing-Medium 	TNGG 160404R/L-A3 160408R/L-A3	9.525	4.76	3.81	0.4 0.8	0°	● ●	
Medium-Roughing 	TNMG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●	
Medium-Roughing 	WNGG 080404AH 080408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●	

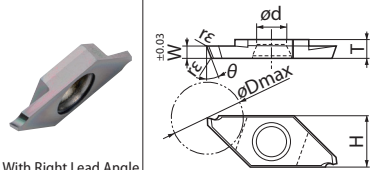
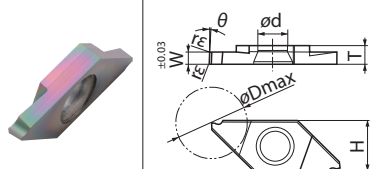
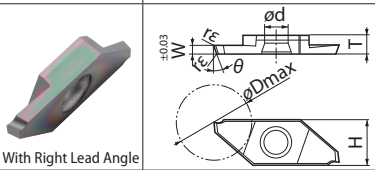
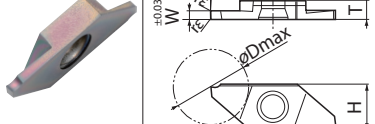
● : Standard Stock

Milling (for MEC Cutter)

Shape	Description	Dimensions (mm)					Angle (°)		DLC coating
		A	T	ød	W	r _ε	α	β	PDL025
	BDGT 11T302FR-JA 11T304FR-JA 11T308FR-JA	6.7	3.8	2.8	11.0	0.2 0.4 0.8	18°	13°	● ● ●
	BDGT 170404FR-JA 170408FR-JA 170420FR-JA 170431FR-JA	9.6	4.9	4.4	17.0	0.4 0.8 2.0 3.1	18°	13°	● ● ● ●

● : Standard Stock

Cut-off TKF

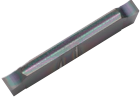
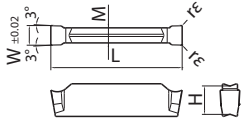
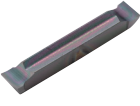
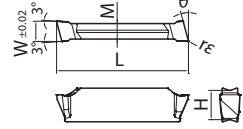
Shape	Description	Dimensions (mm)					Angle (°)		DLC Coating
		W	øD max	r _ε	T	H	ød	θ	PDL025
With Right Lead Angle 	TKF12 ^R /L 100-S-16DR 125-S-16DR 150-S-16DR 200-S-16DR	1.0 1.25 1.5 2.0		0.03	3	8.7	5	16°	● ● ● ●
	TKF12 ^R /L 050-S 070-S 100-S 125-S 150-S 200-S	0.5 0.7 1.0 1.25 1.5 2.0		0.03	3	8.7	5	0°	● ● ● ● ●
With Right Lead Angle 	TKF16 ^R /L 150-S-16DR 200-S-16DR	1.5 2.0	16	0.05	4	9.5	5	16°	● ●
	TKF16 ^R /L 150-S 200-S	1.5 2.0	16	0.05	4	9.5	5	0°	● ●

• Right-hand (R) is shown for inserts with angles.

● : Standard Stock

Standard Stock Items Description

Cut-off GDG

Shape	Description	Dimensions (mm)				Angle (°)	DLC coating		
		Edge Width (W)		rε	M	L	H	θ	PDL025
			Tolerance						
 <p>Low Cutting Force 2-edge</p>	 <p>GDG 2020N-005PG 2520N-005PG 3020N-005PG</p>	2.0 2.5 3.0	±0.02	0.05	1.7 2.1 2.3	20	4.3	0°	● ● ●
 <p>15° Lead Angle Low Cutting Force 2-edge</p>	 <p>GDG 2020R-005PG-15D 2520R-005PG-15D 3020R-005PG-15D</p>	2.0 2.5 3.0	±0.02	0.05	1.7 2.1 2.3	20	4.3	15°	R R R

● : Standard Stock
R: R-hand Only in Stock

Recommended Cutting Conditions

Turning	Chipbreaker	Aluminum Alloy	Cutting Speed Vc (m/min)	Feed Rate f (mm/rev)
Negative	A3	Si 10 % or Less	400 – 500 – 800	0.1 – 0.3
	AH		200 – 300 – 600	0.1 – 0.35
Positive	SK	Si 10 % or Less	100 – 150 – 300	0.03 – 0.12
	CK		100 – 150 – 300	0.03 – 0.12
	CF		100 – 150 – 300	0.02 – 0.15
	AH		100 – 200 – 300	0.05 – 0.25
	A3		100 – 200 – 300	0.05 – 0.2
	F		100 – 200 – 300	0.03 – 0.15
	U		100 – 200 – 300	0.02 – 0.1

Milling Inserts (for MEC)	Aluminum Alloy	Cutting Speed Vc (m/min)	Feed Rate f (mm/rev)
BDGT	Si 13 % or Less	200 – 1,000	0.05 – 0.3
	Si 13 % or Greater	200 – 300	0.05 – 0.2

Cut-off	Aluminum Alloy	Cutting Speed Vc (m/min)	Feed Rate f (mm/rev)
TKF	Si 10 % or Less	200 – 500	0.01 – 0.03
GDG		200 – 500	0.01 – 0.05