

THE NEW VALUE FRONTIER

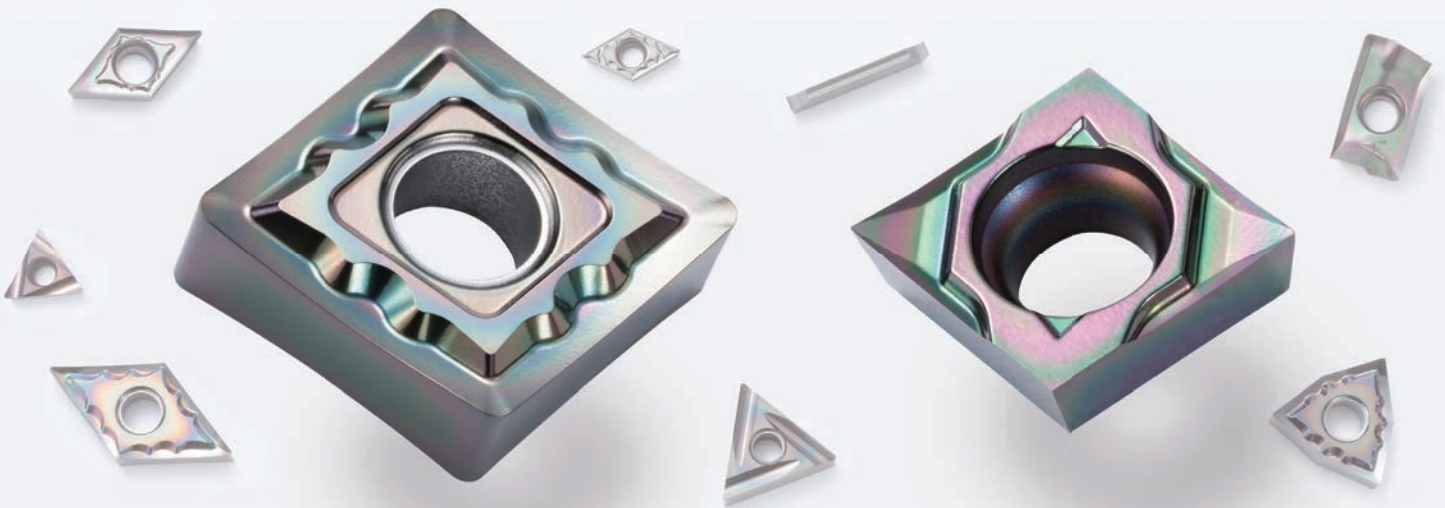


DLC Coating

PDL010
PDL025

DLC Coating

PDL010/PDL025



High Quality and Long Tool Life for Machining Aluminum

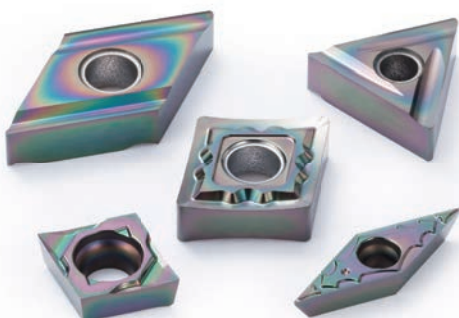
Achieves Long Tool Life with Hardness Close to that of Diamond

Excellent Surface Finish with Aluminum Welding Resistance

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

NEW

New High Wear Resistant
Coating PDL010

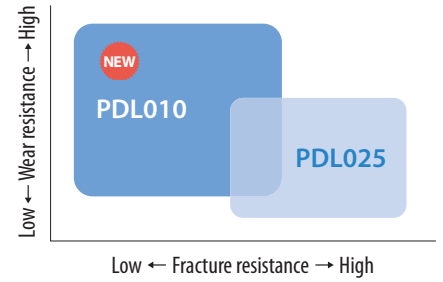


DLC Coating

PDL010/PDL025

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

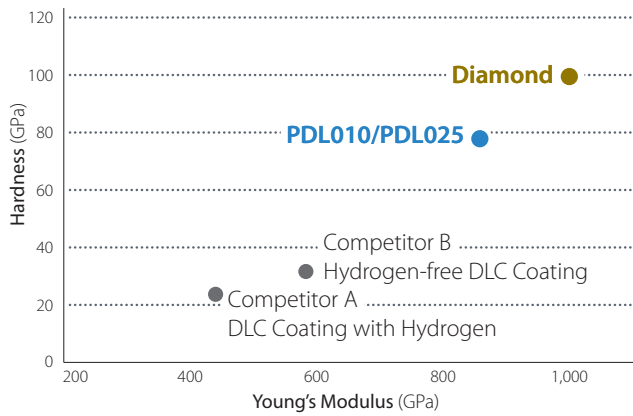
Aluminum Machining Application Map



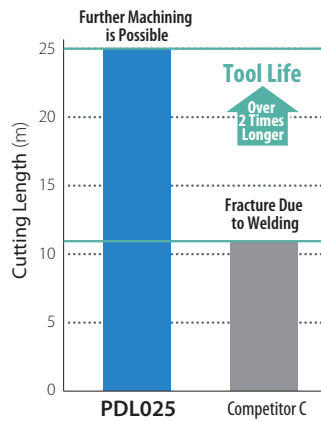
1 Long and Stable Tool Life

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

Coating Properties (In-house Evaluation)



Tool Life (In-house Evaluation)



PDL025 After Machining 25 m



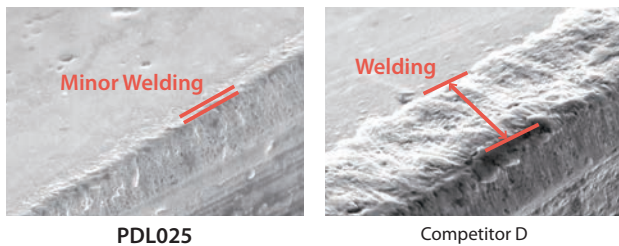
Competitor C After Machining 11 m

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

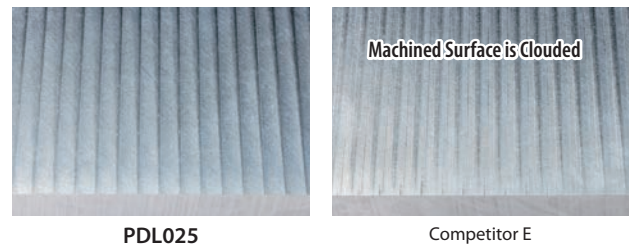
Excellent Surface Finish with Aluminum Welding Resistance

Welding Resistance Comparison (In-house Evaluation)



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)

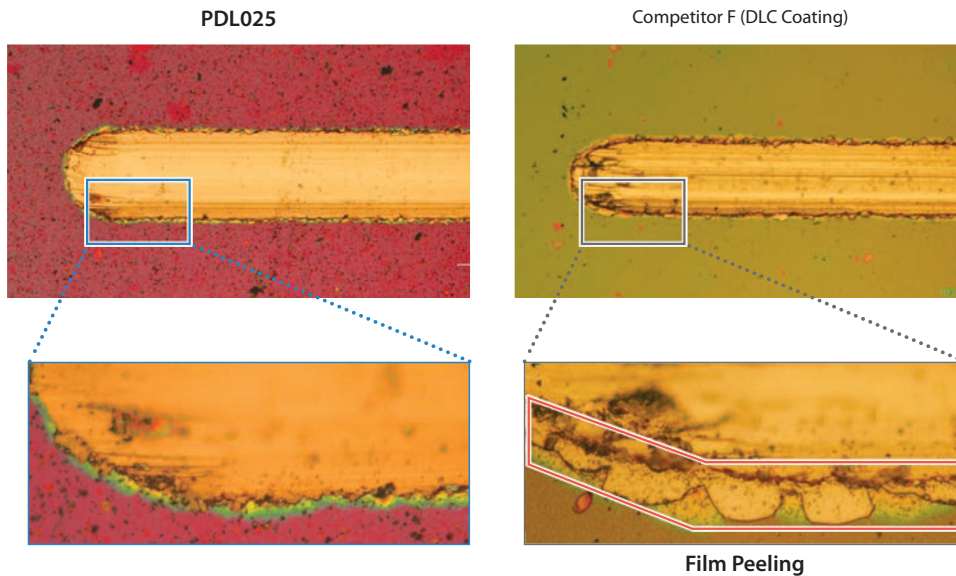


Cutting Conditions: $V_c = 800$ m/min, $f_z = 0.1$ mm/t, $a_p \times a_e = 3 \times 5$ mm, Dry
Cutter Dia. $\phi 25$ mm Workpiece: A6061 Cutting Length: PDL025 (48 m), Competitor E (14 m)

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. $\phi 25$ mm
Insert BDGT11T304FR-JA Workpiece: A5052

4 Large Tooling Lineup

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

Turning



(PDL010/PDL025)

Cut-off



(PDL025)

Milling

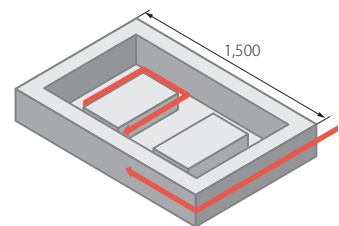


(PDL025)

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

PDL025 7 pcs/edge

Competitor G (6-Flute) 5 pcs/edge










Tool Life
1.4 Times









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 (r _e)		PDL 010	PDL 025
Minute Depth of Cut 	CCGT 030101MP-CF 030102MP-CF	3.5	1.4	1.9	<0.1 <0.2	7°	●	●
	CCGT 040101MP-CF 040102MP-CF	4.3	1.8	2.3	<0.1 <0.2	7°	●	●
Finishing 	CCGT 060201MFP-SK 060202MFP-SK 060204MFP-SK	6.35	2.38	2.8	<0.1 <0.2 <0.4	7°	●	●
	CCGT 09T301MFP-SK 09T302MFP-SK 09T304MFP-SK	9.525	3.97	4.4	<0.1 <0.2 <0.4	7°	●	●
Finishing 	CCGT 060201MP-CK 060202MP-CK	6.35	2.38	2.8	<0.1 <0.2	7°	●	●
	CCGT 09T301MP-CK 09T302MP-CK	9.525	3.97	4.4	<0.1 <0.2	7°	●	●
Finishing-Medium 	CCGT 09T304AH 09T308AH	9.525	3.97	4.4	0.4 0.8	7°	●	●
Finishing-Medium 	CCGT 09T302 ^R / _L -A3 09T304 ^R / _L -A3 09T308 ^R / _L -A3	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●
	CCGT 120402 ^R / _L -A3 120404 ^R / _L -A3 120408 ^R / _L -A3	12.7	4.76	5.5	0.2 0.4 0.8	7°	●	●
Finishing 	Image shows left handed inserts CCET 0301005ML-F 030101ML-F 030102ML-F 030104ML-F	3.5	1.4	1.9	<0.05 <0.1 <0.2 <0.4	7°	L	L
	CCET 040101ML-F 040102ML-F 040104ML-F	4.3	1.8	2.3	<0.1 <0.2 <0.4	7°	L	L
Low Feed 	Image shows right handed inserts CCET 0602005MF ^R / _L -U 060201MF ^R / _L -U 060202MF ^R / _L -U	6.35	2.38	2.8	<0.05 <0.1 <0.2	7°	●	●
	CCET 09T3005MF ^R / _L -U 09T301MF ^R / _L -U 09T302MF ^R / _L -U 09T304MF ^R / _L -U	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	●	●
Minute Depth of Cut 	DCGT 070201MP-CF 070202MP-CF	6.35	2.38	2.8	<0.1 <0.2	7°	●	●
	DCGT 11T301MP-CF 11T302MP-CF	9.525	3.97	4.4	<0.1 <0.2	7°	●	●
Finishing 	DCGT 070201MFP-SK 070202MFP-SK 070204MFP-SK	6.35	2.38	2.8	<0.1 <0.2 <0.4	7°	●	●
	DCGT 11T301MFP-SK 11T302MFP-SK 11T304MFP-SK	9.525	3.97	4.4	<0.1 <0.2 <0.4	7°	●	●

Shape	Description	Dimensions (mm)				Relief Angle	DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (r _e)		PDL 010	PDL 025
Finishing 	DCGT 070201MP-CK 070202MP-CK	6.35	2.38	2.8	<0.1 <0.2	7°	●	●
	DCGT 11T301MP-CK 11T302MP-CK	9.525	3.97	4.4	<0.1 <0.2	7°	●	●
Finishing-Medium 	DCGT 11T304AH 11T308AH	9.525	3.97	4.4	0.4 0.8	7°	●	●
Finishing-Medium 	DCGT 11T302 ^R / _L -A3 11T304 ^R / _L -A3 11T308 ^R / _L -A3	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●
	Image shows right handed inserts DCET 0702005MR-F 070201M ^R / _L -F 070202M ^R / _L -F 070204M ^R / _L -F	6.35	2.38	2.8	<0.05 <0.1 <0.2 <0.4	7°	●	R
Finishing 	DCET 11T3005MR-F 11T301M ^R / _L -F 11T302M ^R / _L -F 11T304M ^R / _L -F	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	R	R
	Image shows right handed inserts DCET 0702005MFR-U 070201MF ^R / _L -U 070202MF ^R / _L -U	6.35	2.38	2.8	<0.05 <0.1 <0.2	7°	●	R
Low Feed 	DCET 11T3005MFR-U 11T301MF ^R / _L -U 11T302MF ^R / _L -U 11T304MFR-U	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	●	R
	Image shows left handed inserts TCGT 110302 ^R / _L -A3 110304 ^R / _L -A3 110308 ^R / _L -A3	6.35	3.18	2.8	0.2 0.4 0.8	7°	●	●
Minute Depth of Cut 	VPGT 110301MP-CF 110302MP-CF	6.35	3.18	2.8	<0.1 <0.2	11°	●	●
	VPGT 080201MP-CK 080202MP-CK	4.76	2.38	2.3	<0.1 <0.2	11°	●	●
Finishing 	VPGT 110301MP-CK 110302MP-CK	6.35	3.18	2.8	<0.1 <0.2	11°	●	●
	VCGT 160404AH	9.525	4.76	4.4	0.4	7°	●	●
Finishing-Medium 	VCGT 160404 ^R / _L -A3 160408 ^R / _L -A3	9.525	4.76	4.4	0.4 0.8	7°	●	●

• Inserts with corner R (r_e) dimension shown with inequality sign (ex: <0.1) indicates minus tolerance of corner R (r_e). ● : 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 _c)	PDL 010	PDL 025	
Finishing-Medium Sharp Edge	CNGG 120404 ^R / _L -A3 120408 ^R / _L -A3	12.70	4.76	5.16	0.4 0.8	● ●	● ●	
Medium-Roughing Sharp Edge	CNGG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	● ●	● ●	
Medium-Roughing	CNMG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	● ●	● ●	
Finishing-Medium Sharp Edge	DNGG 150404 ^R / _L -A3 150408 ^R / _L -A3	12.70	4.76	5.16	0.4 0.8	● ●	● ●	
Medium-Roughing Sharp Edge	DNGG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	● ●	● ●	

Shape	Description	Dimensions (mm)					DLC Coating	
		I.C.	Thickness	Hole Diameter	Corner R (r _c)	PDL 010	PDL 025	
Medium-Roughing Right-hand	DNMG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	● ●	● ●	
Finishing-Medium Sharp Edge	TNGG 160404 ^R / _L -A3 160408 ^R / _L -A3	9.525	4.76	3.81	0.4 0.8	● ●	● ●	
Medium-Roughing Sharp Edge	TNGG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	● ●	● ●	
Medium-Roughing	TNMG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	● ●	● ●	
Medium-Roughing Sharp Edge	WNGG 080404AH 080408AH	12.70	4.76	5.16	0.4 0.8	● ●	● ●	

● : Standard Stock

Cut-off TKF

Shape	Description	Dimensions (mm)							Angle	DLC Coating
		W	øD max	r _c	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	5 8 12 12 12 12	0.03	3	8.7	5	0°	● ● ● ● ● ●	
	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°	● ●	

● : Standard Stock

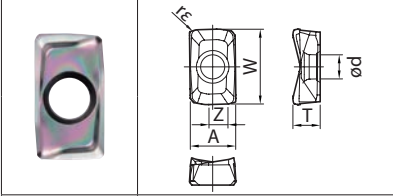
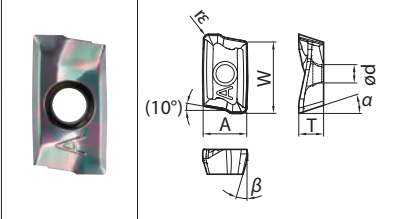
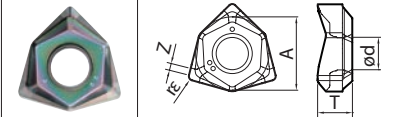
Cut-off GDG

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

Standard Stock Items Description

Milling Inserts (for MEW and MFWN Cutters)

Shape	Description	Dimensions (mm)							Angle		DLC coating
		A	T	ϕd	W	Z	$r\epsilon$	α	β	PDL025	
	LOGT 100408FR-AM	6.8	4.0	3.6	11.1	2.8	0.8	—	—	●	
	LOGT 150508FR-AM	8.9	5.6	4.9	15.9	2.8	0.8	—	—	●	
	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°	● ● ● ●	
	WNGT 080608FN-AM	14.02	6.65	6.2	—	1.5	0.8	—	—	●	

● : Standard 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	Si 10 % or Less Cutting Dia. $\phi 10$ or More	100 – 250 – 500	0.03 – 0.2
		Si 10 % or Less Cutting Dia. $\phi 10$ or Less	100 – 200 – 300	0.03 – 0.2
U	Si 10 % or Less Cutting Dia. $\phi 10$ or More	100 – 250 – 500	0.03 – 0.2	
	Si 10 % or Less Cutting Dia. $\phi 10$ or Less	100 – 200 – 300	0.03 – 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

Milling Inserts	Aluminum Alloy	Cutting Speed Vc (m/min)	Feed Rate f (mm/rev)
LOGT (For MEW Cutters)	Si 13 % or Less	200 – 900	0.05 – 0.3
	Si 13 % or Greater	200 – 300	0.05 – 0.2
BDGT (For MEC Cutters)	Si 13 % or Less	200 – 900	0.05 – 0.3
	Si 13 % or Greater	200 – 300	0.05 – 0.2
WNGT (For MFWN Cutters)	Si 13 % or Less	200 – 900	0.1 – 0.3
	Si 13 % or Greater	200 – 300	0.1 – 0.2