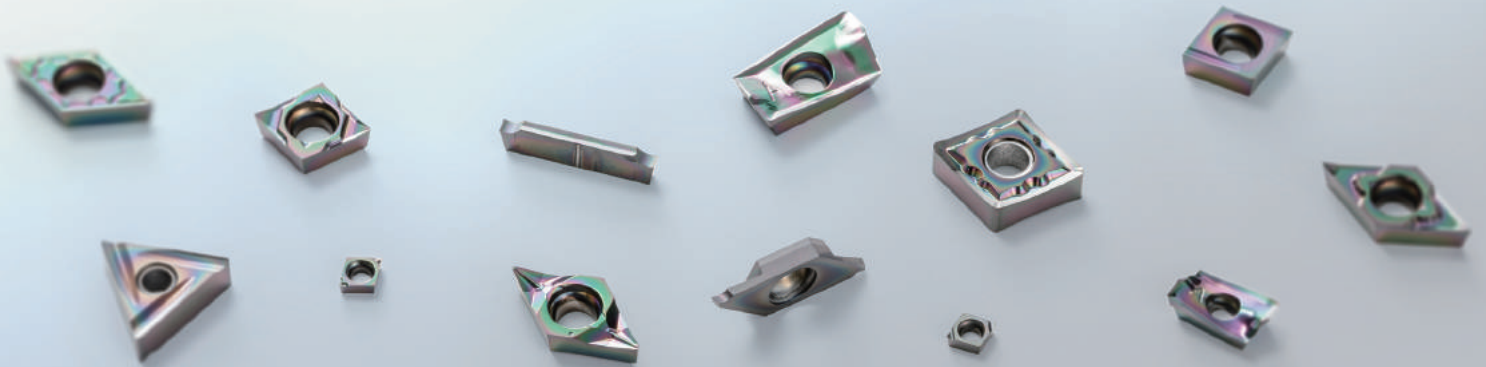


THE NEW VALUE FRONTIER



DLC coating | **PDL025**

# 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

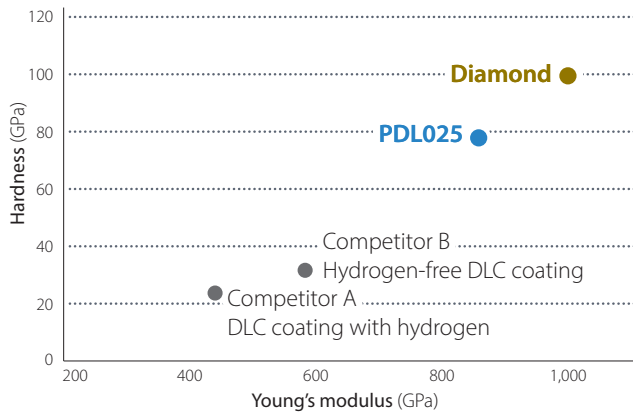
# PDL025

- Achieves long tool life with hardness close to that of diamond
- Large lineup for turning, milling and cut-off operations

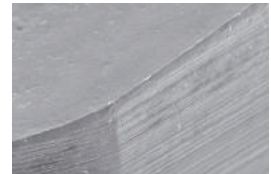
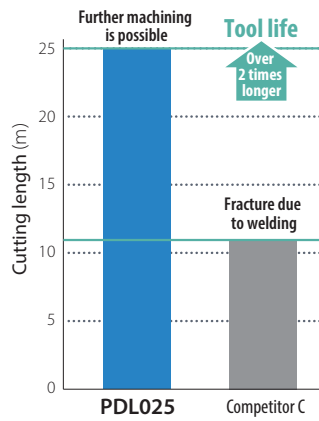
## 1 Long and stable tool life

High hardness with Kyocera's proprietary hydrogen-free DLC coating.

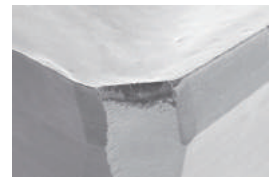
Coating properties



Tool life (In-house evaluation)



PDL025 After machining 25 m



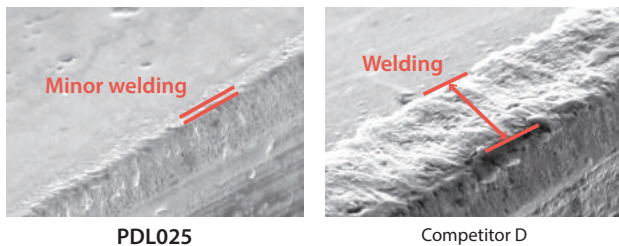
Competitor C After machining 11 m

Cutting conditions:  $V_c = 500$  m/min,  $f_z = 0.2$  mm/t,  $a_p \times a_e = 3$  mm  $\times$  5 mm, dry  
Cutter diameter: 25 mm, Workpiece: AlZnMgCu1.5

## 2 Excellent surface finish

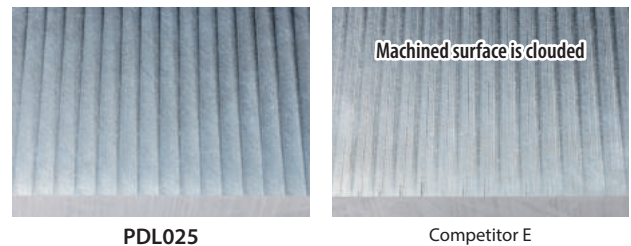
Excellent surface finish with aluminum welding resistance.

Welding resistance comparison (In-house evaluation)



Cutting conditions:  $V_c = 800$  m/min,  $f_z = 0.1$  mm/t,  $a_p \times a_e = 3$  mm  $\times$  5 mm, dry  
Cutter diameter: 25 mm, Workpiece: AlMg2.5, Cutting length: 57 m

Machined surface comparison (In-house evaluation)



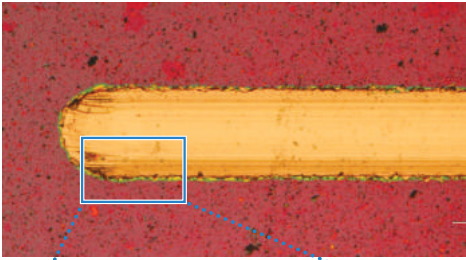
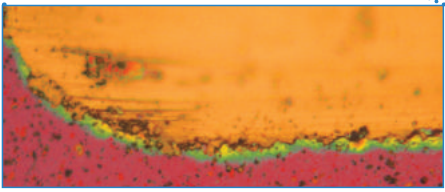
Cutting conditions:  $V_c = 800$  m/min,  $f_z = 0.1$  mm/t,  $a_p \times a_e = 3$  mm  $\times$  5 mm, dry  
Cutter diameter: 25 mm, Workpiece: AlMg1SiCu  
Cutting length: PDL025 (48 m), Competitor E (14 m)

### 3 Stable machining

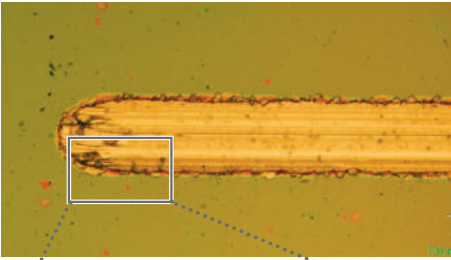
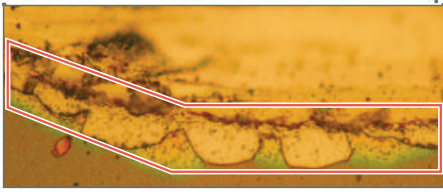
- Stable machining due to DLC coating layer with excellent peeling resistance
- Improved chip evacuation due to high lubrication

Scratch test: coating conditions comparison with load 80 N·m (In-house evaluation)

**PDL025**


**Competitor F (DLC coating)**

**Film peeling**


**Chip shape**

**PDL025**



Even chips with small curl diameter

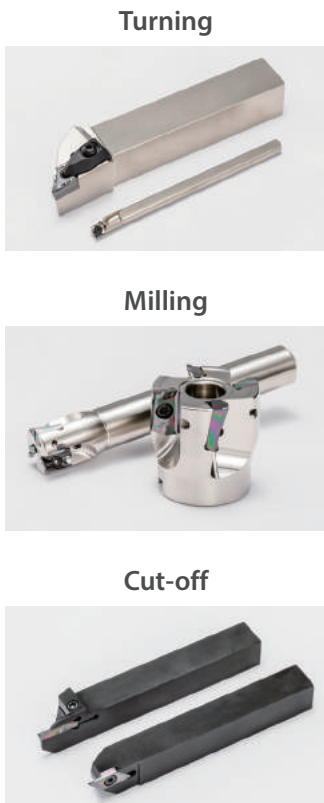
**Carbide (non-coated)**



Cutting conditions:  $V_c = 800$  m/min,  $f_z = 0.1$  mm/t,  
 $a_p \times a_e = 3$  mm  $\times$  5 mm, dry,  
 Cutter diameter: 25 mm  
 Insert BDGT11T304FR-JA, Workpiece: AlMg2.5

### 4 Large tooling lineup

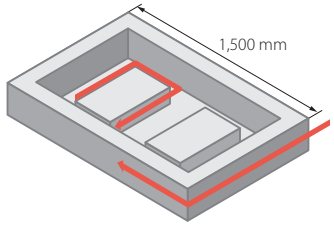
Wide range of applications including turning, milling and cut-off operations.



**Case study**

**Block: AlMg2.5**

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


















Number of workpieces		<b>Tool life</b>
<b>PDL025</b>	<b>7 pcs/edge</b>	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>1.4</b> times                 </div>
<b>Competitor G</b> (6 teeth)	<b>5 pcs/edge</b>	

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)

# Inserts

## Turning inserts (positive)

Shape	Description	Dimensions (mm)				Relief angle	PDL025
		I.C.	Thickness	Hole diameter	Corner R (r <sub>e</sub> )		
Minute ap  Sharp edge/ Mirror surface finish	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  Sharp edge/ Mirror surface finish	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°	● ● ●
	CCGT 060201MP-CK 060202MP-CK	6.35	2.38	2.8	<0.1 <0.2	7°	● ●
Finishing  Sharp edge/ Mirror surface finish	CCGT 09T301MP-CK 09T302MP-CK	9.525	3.97	4.4	<0.1 <0.2	7°	● ●
	CCGT 09T304AH 09T308AH	9.525	3.97	4.4	0.4 0.8	7°	● ●
Finishing-Medium  Sharp edge	CCGT 09T302 <sup>R</sup> /L-A3 09T304 <sup>R</sup> /L-A3 09T308 <sup>R</sup> /L-A3	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●
	CCGT 120402 <sup>R</sup> /L-A3 120404 <sup>R</sup> /L-A3 120408 <sup>R</sup> /L-A3	12.7	4.76	5.5	0.2 0.4 0.8	7°	● ● ●
Finishing-Medium  Sharp edge	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 L L
	CCET 040101ML-F 040102ML-F 040104ML-F	4.3	1.8	2.3	<0.1 <0.2 <0.4	7°	L L L
Low feed  Sharp edge	CCET 0602005M <sup>R</sup> /L-U 060201M <sup>R</sup> /L-U 060202M <sup>R</sup> /L-U	6.35	2.38	2.8	<0.05 <0.1 <0.2	7°	● ● ●
	CCET 09T3005M <sup>R</sup> /L-U 09T301M <sup>R</sup> /L-U 09T302M <sup>R</sup> /L-U 09T304M <sup>R</sup> /L-U	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	● ● ● ●
	DCGT 070201MP-CF 070202MP-CF	6.35	2.38	2.8	<0.1 <0.2	7°	● ●
Minute ap  Sharp edge/ Mirror surface finish	DCGT 11T301MP-CF 11T302MP-CF	9.525	3.97	4.4	<0.1 <0.2	7°	● ●
	DCGT 070201MFP-SK 070202MFP-SK 070204MFP-SK	6.35	2.38	2.8	<0.1 <0.2 <0.4	7°	● ● ●
Finishing  Sharp edge/ Mirror surface finish	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	PDL025
		I.C.	Thickness	Hole diameter	Corner R (r <sub>e</sub> )		
Finishing  Sharp edge/ Mirror surface finish	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  Sharp edge	DCGT 11T304AH 11T308AH	9.525	3.97	4.4	0.4 0.8	7°	● ●
	DCGT 11T302 <sup>R</sup> /L-A3 11T304 <sup>R</sup> /L-A3 11T308 <sup>R</sup> /L-A3	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●
Finishing  Sharp edge	DCET 0702005M <sup>R</sup> -F 070201M <sup>R</sup> /L-F 070202M <sup>R</sup> /L-F 070204M <sup>R</sup> /L-F	6.35	2.38	2.8	<0.05 <0.1 <0.2 <0.4	7°	R ● ● ●
	DCET 11T3005M <sup>R</sup> -F 11T301M <sup>R</sup> /L-F 11T302M <sup>R</sup> /L-F 11T304M <sup>R</sup> /L-F	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	R ● ● ●
	DCET 0702005M <sup>R</sup> -U 070201M <sup>R</sup> /L-U 070202M <sup>R</sup> /L-U	6.35	2.38	2.8	<0.05 <0.1 <0.2	7°	R ● ●
Low feed  Sharp edge	DCET 11T3005M <sup>R</sup> -U 11T301M <sup>R</sup> /L-U 11T302M <sup>R</sup> /L-U 11T304M <sup>R</sup> -U	9.525	3.97	4.4	<0.05 <0.1 <0.2 <0.4	7°	R ● ● R
	TCGT 110302 <sup>R</sup> /L-A3 110304 <sup>R</sup> /L-A3 110308 <sup>R</sup> /L-A3	6.35	3.18	2.8	0.2 0.4 0.8	7°	● ● ●
Minute ap  Sharp edge/ Mirror surface finish	VPGT 110301MP-CF 110302MP-CF	6.35	3.18	2.8	<0.1 <0.2	11°	● ●
Finishing  Sharp edge/ Mirror surface finish	VPGT 080201MP-CK 080202MP-CK	4.76	2.38	2.3	<0.1 <0.2	11°	● ●
	VPGT 110301MP-CK 110302MP-CK	6.35	3.18	2.8	<0.1 <0.2	11°	● ●
Finishing-Medium  Sharp edge	VCGT 160404AH	9.525	4.76	4.4	0.4	7°	●
	VCGT 160404 <sup>R</sup> /L-A3 160408 <sup>R</sup> /L-A3	9.525	4.76	4.4	0.4 0.8	7°	● ●

Inserts with corner R (r<sub>e</sub>) dimension shown with inequality sign (ex: <0.1) indicates minus tolerance of corner R (r<sub>e</sub>).

● Available  
R: R-hand only  
L: L-hand only

# Inserts

## Turning inserts (negative)

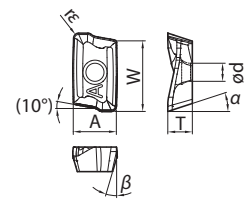
Shape	Description	Dimensions (mm)					PDL025
		I.C.	Thickness	Hole diameter	Corner R (r <sub>e</sub> )	Relief angle	
Medium-Roughing Sharp edge	CNGG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●
Finishing-Medium Sharp edge	CNGG 120404R/L-A3 120408R/L-A3	12.70	4.76	5.16	0.4 0.8	0°	● ●
Medium-Roughing Sharp edge	CNMG 120404AH 120408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●
Medium-Roughing Sharp edge	DNGG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●
Finishing-Medium Sharp edge	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)					PDL025
		I.C.	Thickness	Hole diameter	Corner R (r <sub>e</sub> )	Relief angle	
Medium-Roughing Sharp edge	DNMG 150404AH 150408AH	12.70	4.76	5.16	0.4 0.8	0°	● ●
Medium-Roughing Sharp edge	TNGG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●
Finishing-Medium Sharp edge	TNGG 160404R/L-A3 160408R/L-A3	9.525	4.76	3.81	0.4 0.8	0°	● ●
Medium-Roughing Sharp edge	TNMG 160404AH 160408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●
Medium-Roughing Sharp edge	WNGG 080404AH 080408AH	9.525	4.76	3.81	0.4 0.8	0°	● ●

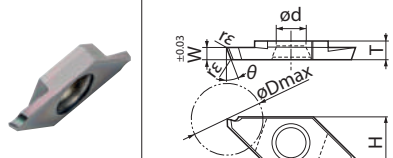
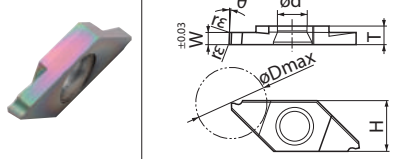
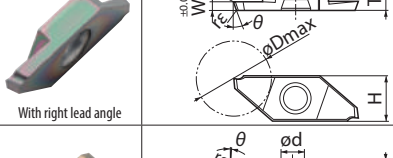
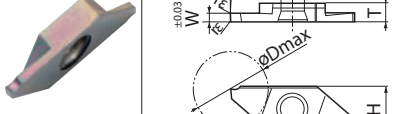
● Available

## Milling insert for MEC cutter

Shape	Description	Dimensions (mm)					Angle (°)		PDL025
		A	T	ød	W	r <sub>e</sub>	α	β	
	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°	● ● ● ●

● Available

## Cut-off inserts for KTKF toolholder

Shape	Description	Dimensions (mm)					Angle (°)		PDL025
		W	øD max	r <sub>e</sub>	T	H	ød	θ	
 With right lead angle	TKF12 <sup>R/L</sup> 100-S-16DR 125-S-16DR 150-S-16DR 200-S-16DR	1.0 1.25 1.5 2.0	12	0.03	3	8.7	5	16°	● ● ● ●
 With right lead angle	TKF12 <sup>R/L</sup> 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°	● ● ● ● ● ●
 With right lead angle	TKF16 <sup>R/L</sup> 150-S-16DR 200-S-16DR	1.5 2.0	16	0.05	4	9.5	5	16°	● ●
 With right lead angle	TKF16 <sup>R/L</sup> 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.

● Available

# Inserts

## Cut-off inserts for KGD toolholder

Shape	Description	Dimensions (mm)					Angle (°)	PDL025	
		Edge width (W)		rε	M	L	H		θ
			Tolerance						
<p>Low cutting force/2-edge</p>	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°	● ● ●
<p>15° lead angle/ low cutting force/2-edge</p>	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

● Available  
R: R-hand only

## Recommended cutting conditions

Turning	Chipbreaker	Aluminum alloy	Vc (m/min)	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	Aluminum alloy	Vc (m/min)	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	Vc (m/min)	f (mm/rev)
TKF	Si 10 % or less	200–500	0.01–0.03
GDG		200–500	0.01–0.05