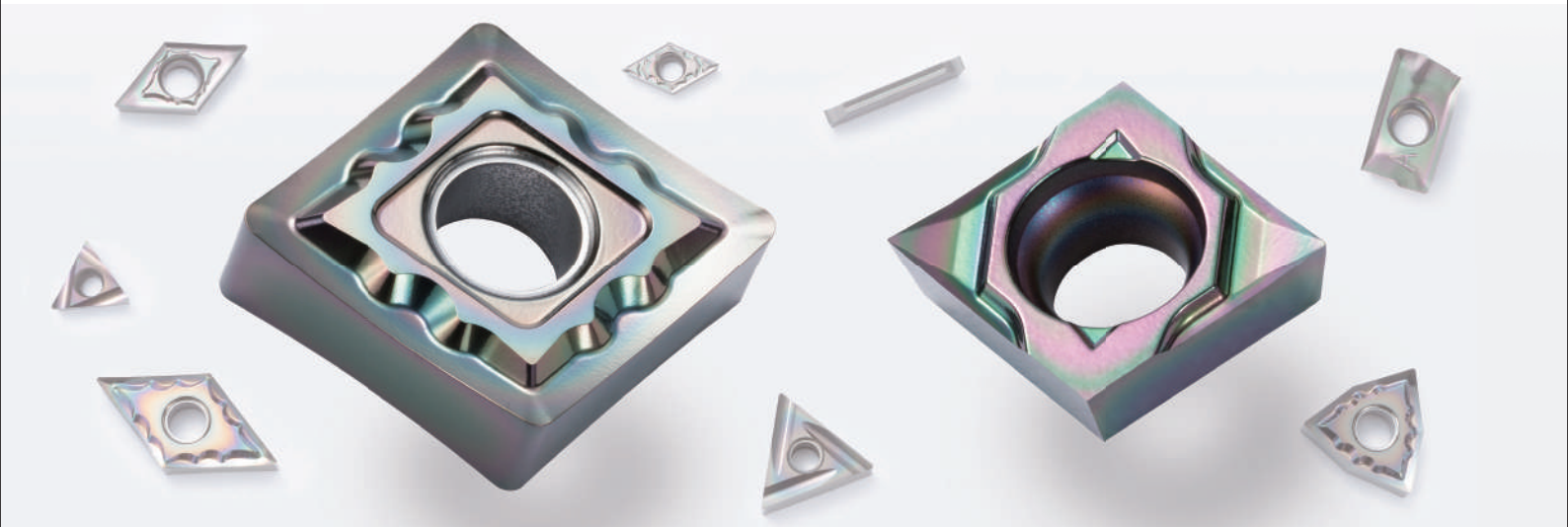
THE NEW VALUE FRONTIER

KYOCERA

DLC Coating

PDL010/PDL025



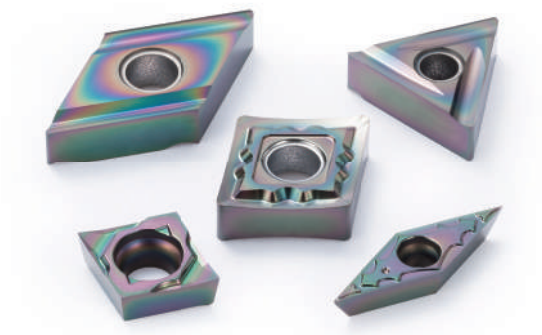
High Quality and Long Tool Life for Machining Aluminum

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 High Wear Resistant Coating PDL010

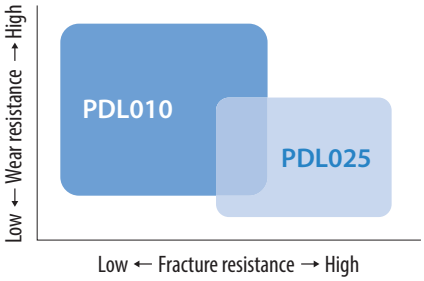


DLC Coating

PDL010/PDL025

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

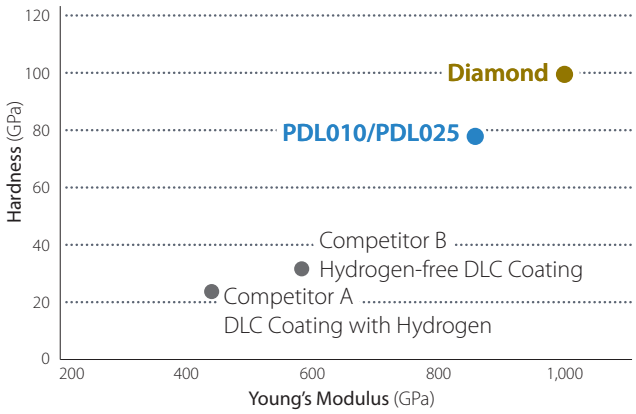
Aluminum Machining Application Map



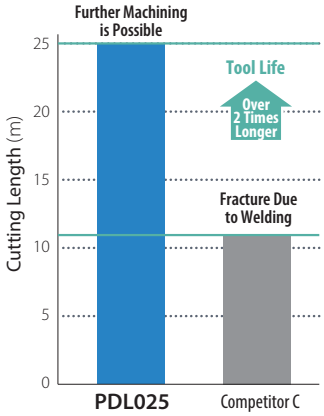
1 Long and Stable Tool Life

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

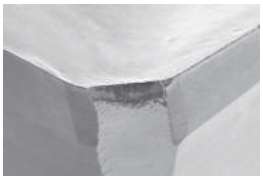
Coating Properties (In-house Evaluation)



Tool Life (In-house Evaluation)



PDL025 After Machining 25 m



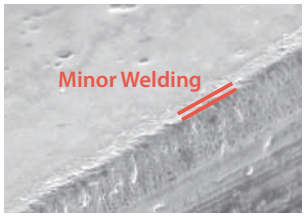
Competitor C After Machining 11 m

Cutting Conditions: Vc = 500 m/min, fz = 0.2 mm/t, ap × ae = 3 × 5 mm, Dry
Cutter Dia. ø25 mm Workpiece: A7075

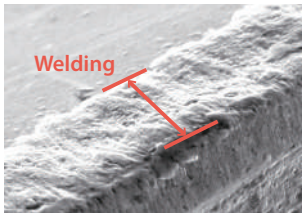
2 Excellent Surface Finish

Excellent Surface Finish with Aluminum Welding Resistance

Welding Resistance Comparison (In-house Evaluation)



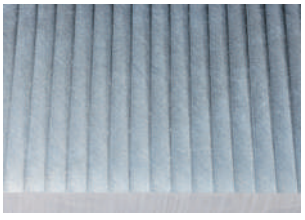
PDL025



Competitor D

Cutting Conditions: Vc = 800 m/min, fz = 0.1 mm/t, ap × ae = 3 × 5 mm, Dry
Cutter Dia. ø25 mm Workpiece: A5052 Cutting Length: 57 m

Machined Surface Comparison (In-house Evaluation)



PDL025

Competitor E

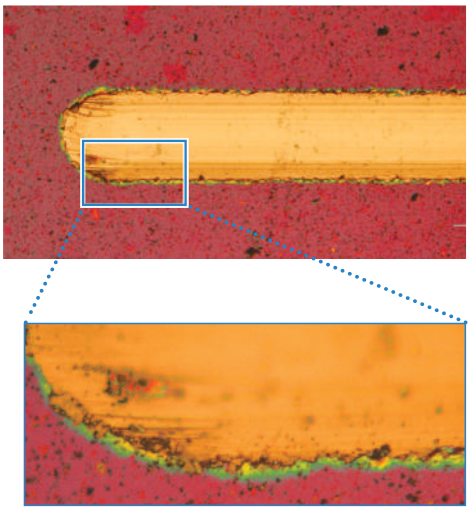
Cutting Conditions: Vc = 800 m/min, fz = 0.1 mm/t, ap × ae = 3 × 5 mm, Dry
Cutter Dia. ø25 mm Workpiece: A6061 Cutting Length: PDL025 (48 m), Competitor E (14 m)

3 Stable Machining

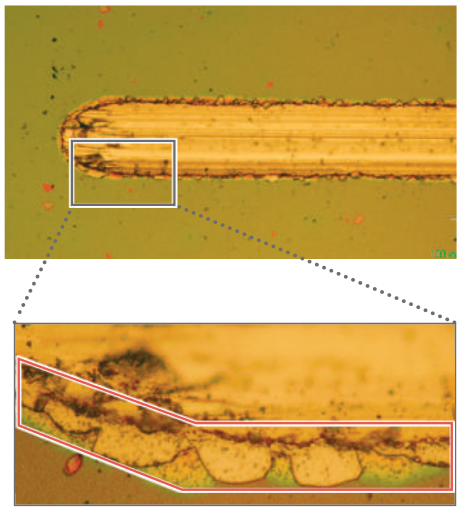
Stable Machining Due to DLC Coating Layer with Excellent Peeling Resistance
Improved Chip Evacuation Due to High Lubrication

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

PDL025



Competitor F (DLC Coating)



Film Peeling

Chip Shape

PDL025

Even Chips with Small Curl Diameter

Carbide (non-coated)

Cutting Conditions:Vc = 800 m/min, fz = 0.1 mm/t,
ap × ae = 3 × 5 mm, Dry Cutter Dia. ø25 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)

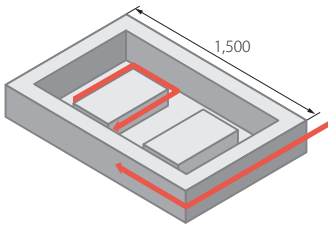
Milling

(PDL025)

Case Study

Block A5052

Vc = 450 m/min
fz = 0.15 mm/t
(Vf = 1,900 mm/min)
ap × ae = 2 × ~ 80 mm
Wet
MEC080R-11-7T (7-Flute)
BDGT11T308FR-JA PDL025



Number of Workpieces

Tool Life

PDL025 **7 pcs/edge** 1.4 Times

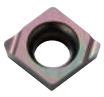
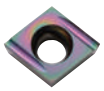
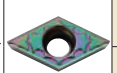
Competitor G (6-Flute) **5 pcs/edge**

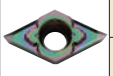
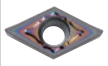
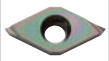
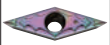
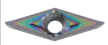
PDL025 has less welding compared to Competitor G and tool life is improved by 1.4 times.
A good wall and surface finish is achieved.

(User Evaluation)

Standard Stock Items Description

Turning Inserts (Positive)

Shape	Description	Dimensions (mm) I.C.	Thickness	Hole Diameter	Corner R (rε)	Relief Angle	DLC Coating PDL 010	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		●	●
	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		●	●
	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		●	●
	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°	●	●
	09T308AH				0.8		●	●
Finishing-Medium Image shows right handed inserts  Sharp Edge	CCGT 09T302R/L-A3	9.525	3.97	4.4	0.2	7°	●	●
	09T304R/L-A3				0.4		●	●
	09T308R/L-A3				0.8		●	●
	CCGT 120402R/L-A3	12.7	4.76	5.5	0.2	7°		●
	120404R/L-A3				0.4			●
	120408R/L-A3				0.8			●
Finishing Image shows left handed inserts  Sharp Edge	CCET 0301005ML-F	3.5	1.4	1.9	<0.05	7°		L
	030101ML-F				<0.1		L	L
	030102ML-F				<0.2		L	L
	030104ML-F				<0.4		L	L
	CCET 040101ML-F	4.3	1.8	2.3	<0.1	7°	L	L
	040102ML-F				<0.2		L	L
	040104ML-F				<0.4		L	L
Low Feed Image shows right handed inserts  Sharp Edge	CCET 0602005MFR/L-U	6.35	2.38	2.8	<0.05	7°		●
	060201MFR/L-U				<0.1		●	●
	060202MFR/L-U				<0.2		●	●
	CCET 09T3005MFR/L-U	9.525	3.97	4.4	<0.05	7°		●
	09T301MFR/L-U				<0.1		●	●
	09T302MFR/L-U				<0.2		●	●
	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°	●	●
	070202MP-CF				<0.2		●	●
	DCGT 11T301MP-CF	9.525	3.97	4.4	<0.1	7°	●	●
	11T302MP-CF				<0.2		●	●
Finishing  Sharp Edge Mirror Surface Finish	DCGT 070201MFP-SK	6.35	2.38	2.8	<0.1	7°	●	●
	070202MFP-SK				<0.2		●	●
	070204MFP-SK				<0.4		●	●
	DCGT 11T301MFP-SK	9.525	3.97	4.4	<0.1	7°	●	●
	11T302MFP-SK				<0.2		●	●
	11T304MFP-SK				<0.4		●	●

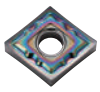
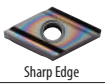
Shape	Description	Dimensions (mm) I.C.	Thickness	Hole Diameter	Corner R (rε)	Relief Angle	DLC Coating PDL 010	PDL 025
Finishing  Sharp Edge Mirror Surface Finish	DCGT 070201MP-CK	6.35	2.38	2.8	<0.1	7°	●	●
	070202MP-CK				<0.2		●	●
	DCGT 11T301MP-CK	9.525	3.97	4.4	<0.1	7°	●	●
	11T302MP-CK				<0.2		●	●
Finishing-Medium  Sharp Edge	DCGT 11T304AH	9.525	3.97	4.4	0.4	7°	●	●
	11T308AH				0.8		●	●
Finishing-Medium Image shows right handed inserts  Sharp Edge	DCGT 11T302R/L-A3	9.525	3.97	4.4	0.2	7°	●	●
	11T304R/L-A3				0.4		●	●
	11T308R/L-A3				0.8		●	●
Finishing Image shows right handed inserts  Sharp Edge	DCET 0702005MR-F	6.35	2.38	2.8	<0.05	7°		R
	070201MR/L-F				<0.1		●	●
	070202MR/L-F				<0.2		●	●
	070204MR/L-F				<0.4		●	●
	DCET 11T3005MR-F	9.525	3.97	4.4	<0.05	7°	R	R
	11T301MR/L-F				<0.1		●	●
	11T302MR/L-F				<0.2		●	●
	11T304MR/L-F				<0.4		●	●
Low Feed Image shows right handed inserts  Sharp Edge	DCET 0702005MFR-U	6.35	2.38	2.8	<0.05	7°		R
	070201MFR/L-U				<0.1		●	●
	070202MFR/L-U				<0.2		●	●
	DCET 11T3005MFR-U	9.525	3.97	4.4	<0.05	7°		R
	11T301MFR/L-U				<0.1		●	●
	11T302MFR/L-U				<0.2		●	●
	11T304MFR-U				<0.4		R	R
Finishing-Medium Image shows left handed inserts  Sharp Edge	TCGT 110302R/L-A3	6.35	3.18	2.8	0.2	7°	●	●
	110304R/L-A3				0.4		●	●
	110308R/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°	●	●
	110302MP-CF				<0.2		●	●
Finishing  Sharp Edge Mirror Surface Finish	VPGT 080201MP-CK	4.76	2.38	2.3	<0.1	11°	●	●
	080202MP-CK				<0.2		●	●
	VPGT 110301MP-CK	6.35	3.18	2.8	<0.1	11°	●	●
	110302MP-CK				<0.2		●	●
Finishing-Medium  Sharp Edge	VCGT 160404AH	9.525	4.76	4.4	0.4	7°	●	●
Finishing-Medium Image shows right handed inserts  Sharp Edge	VCGT 160404R/L-A3	9.525	4.76	4.4	0.4	7°	●	●
	160408R/L-A3				0.8		●	●

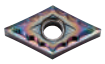
• Inserts with corner R (rε) dimension shown with inequality sign (ex: <0.1) indicates minus tolerance of corner R (rε).

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

Standard Stock Items Description

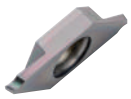
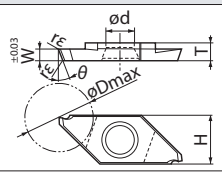
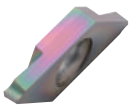
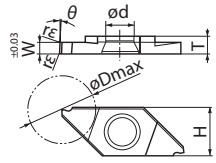
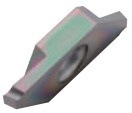
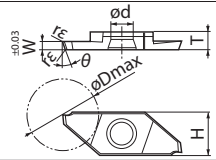
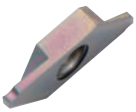
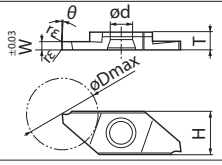
Turning Inserts (Negative)

Shape (Handed Insert shows Right-hand)		Description	Dimensions (mm) I.C.	Thickness	Hole Diameter	Corner R (rε)	DLC Coating 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 (Handed Insert shows Right-hand)		Description	Dimensions (mm) I.C.	Thickness	Hole Diameter	Corner R (rε)	DLC Coating PDL 010	PDL 025
Medium-Roughing		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	● ●	● ●

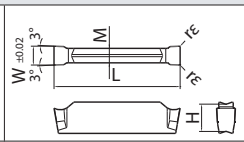
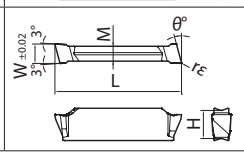
● : Standard Stock

Cut-off TKF

Shape (Handed Insert shows Right-hand)		Description	Dimensions (mm) W	øD max	rε	T	H	ød	Angle θ	DLC Coating 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	12	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°	● ● ● ● ● ●
 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°	● ●

● : Standard Stock

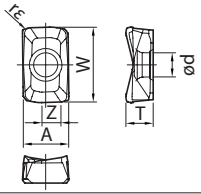
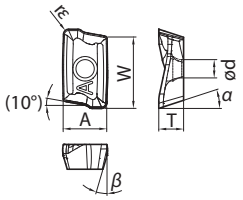
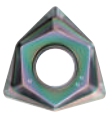
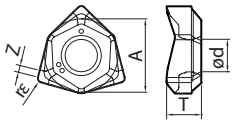
Cut-off GDG

Shape		Description	Dimensions (mm) Edge Width (W)	Tolerance	rε	M	L	H	Angle θ	DLC coating 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°	● ● ●
 15° Lead Angle Low Cutting Force 2-edge		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	ød	W	Z	rε	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. ø10 or More	100 – 250 – 500	0.03 – 0.2
		Si 10 % or Less Cutting Dia. ø10 or Less	100 – 200 – 300	0.03 – 0.2
	U	Si 10 % or Less Cutting Dia. ø10 or More	100 – 250 – 500	0.03 – 0.2
		Si 10 % or Less Cutting Dia. ø10 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