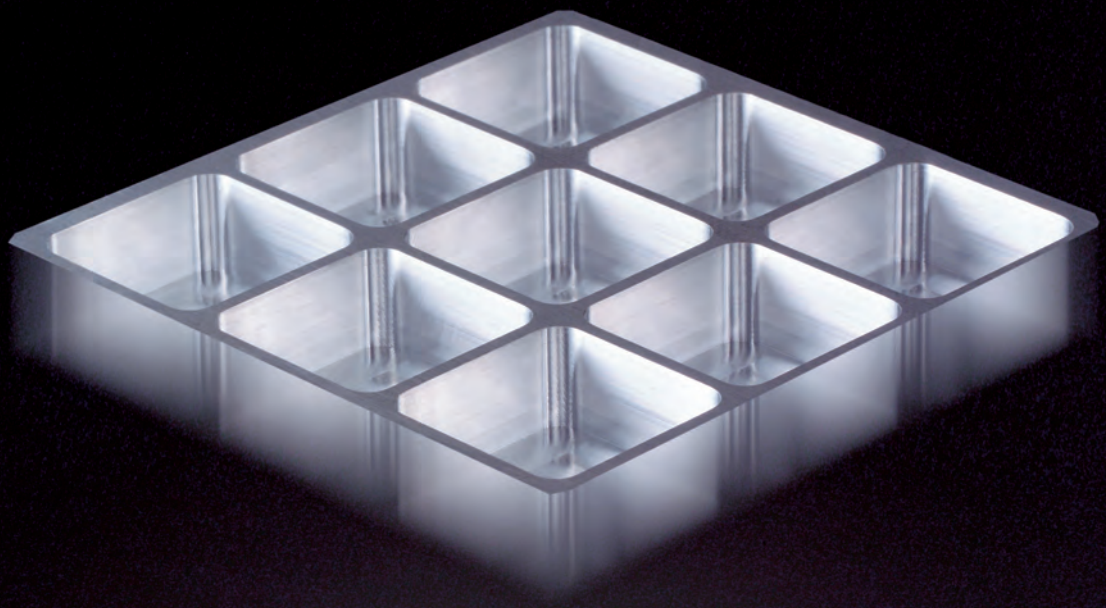
MITSUBISHI
MITSUBISHI MATERIALS

TOOLS NEWS

B057G

DLC COATING END MILL

DLC-2MA



DLC Coating End Mill

High performance and long tool life for non-ferrous materials

CARBIDE END MILLS

DLC-2MA

Medium, 2 flute, For Non-ferrous material

Feature

DLC coated end mills is suitable for machining of non-ferrous materials.

Due to applying DLC coating with superior anti-adhesion, high performance is realized in milling of non-ferrous materials such as Al-alloy, GFRP, CFRP, Copper-alloy and graphite.

Applying for new developed DLC coating. The hardness of film such as diamond is realized with high adhesion.

Adhesion used to be the weak point of DLC coating. We developed original DLC coating with obtains superior adhesion level (Co-developed with NAGATA SEIKI CO., LTD.).

High performance shows with suitable design and applying for original carbide material.

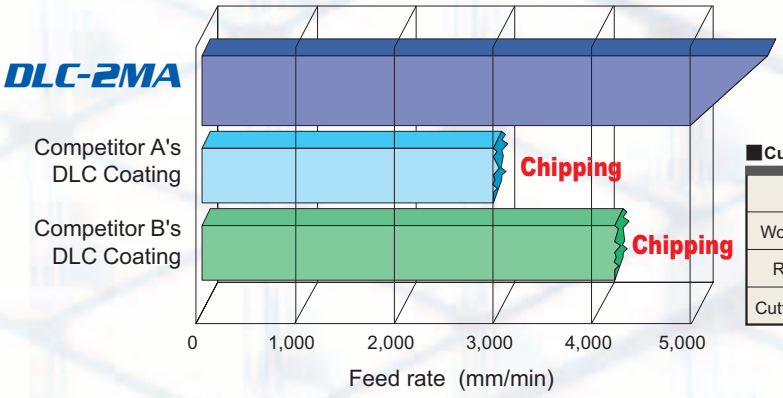
Applying most suitable original design for non-ferrous materials and carbide material, low cutting force and good chip disposability are realized.

Close hardness Diamond

Characteristic of DLC coating

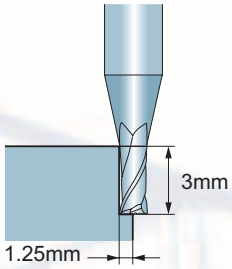
	DLC	Competitor's DLC	Diamond	TiN
Hardness (HV)	6,000—7,000	1,000—7,000	7,000—10,000	2,000
Wear Coefficient	0.1	0.1	0.4	0.4

Machining example



Cutting conditions

End mill	DLC-2MA ϕ3
Work material	AC4C-T6
Revolution	20,000min^{-1}(188m/min)
Cutting method	Climb cut, Air blow



Performance report (1)

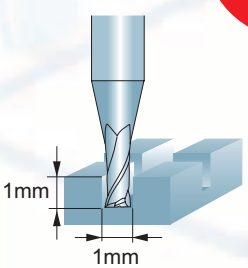
Al-alloy

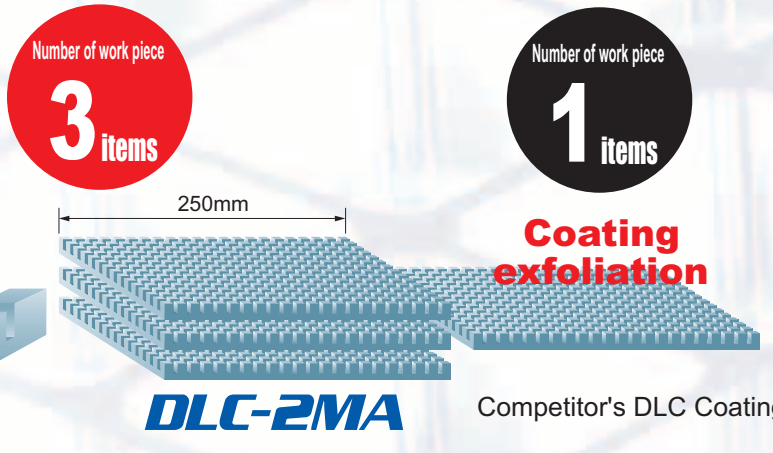
Tool life is 3 times

as competitor's DLC coating

Cutting conditions

End mill	DLC-2MA ϕ1
Work material	A5052
Revolution	10,000min^{-1}(31m/min)
Feed rate	150mm/min
Cutting method	Slotting, Oil

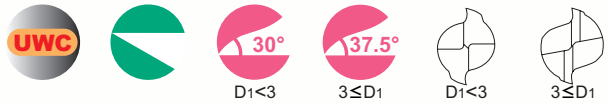


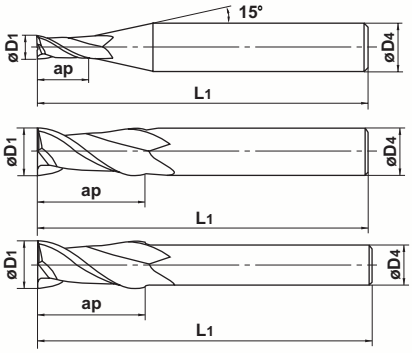


DLC-2MA

Medium, 2 flute, For Non-ferrous material

D1≤12 -0.020
12<D1 -0.030





Unit : mm

- Due to applying for DLC coating with superior anti adhesion, high performance is realized in milling of non-ferrous materials such as Al-alloy, GFRP, CFRP, Copper-alloy and graphite.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flute N	Stock	Type
DLC2MAD0100	1	2.5	40	4	2	●	1
D0150	1.5	4	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0250	2.5	8	40	4	2	●	1
D0300	3	8	45	6	2	●	1
D0400	4	11	45	6	2	●	1
D0500	5	13	50	6	2	●	1
D0600	6	13	50	6	2	●	2
D0800	8	19	60	8	2	●	2
D1000	10	22	70	10	2	●	2
D1200	12	26	75	12	2	●	2
D1400	14	26	75	12	2	●	3
D1500	15	30	80	16	2	●	1
D1600	16	32	90	16	2	●	2
D1800	18	32	90	16	2	●	3
D2000	20	38	100	20	2	●	2

● : Inventory maintained.

Performance report (2)

GFRP (Glass Fiber Reinforced Plastic)

High efficiency milling

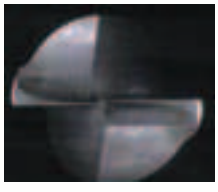
DLC-2MA

Number of work piece 12 items

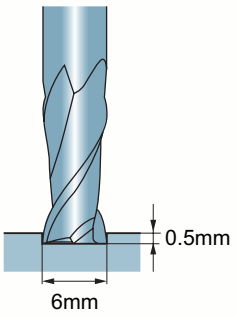
Cutting length 1,064m

(Ti,Al)N Coating

Number of work piece 3 items



Cutting length 266m



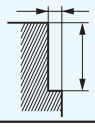
■Cutting conditions

End mill	DLC-2MA ϕ6
Work material	GFRP
Revolution	8,000min^{-1}(151m/min)
Feed rate	2,000mm/min
Cutting method	Air blow

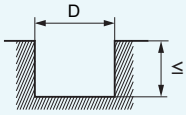
DLC-2MA

Medium, 2 flute, For Non-ferrous material

Side milling

Work material	Aluminum alloy A7075		Aluminum cast AC4B	
Cutting speed	300m/min		240m/min	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40,000	600	40,000	460
2	40,000	1,100	38,000	850
3	32,000	1,400	25,000	950
4	24,000	1,500	19,000	1,000
5	19,000	1,600	15,000	1,000
6	16,000	1,900	13,000	1,100
8	12,000	1,900	9,500	1,200
10	9,500	1,900	7,600	1,200
12	8,000	1,900	6,400	1,200
16	6,000	1,900	4,800	1,200
20	4,800	1,500	3,800	1,000
Depth of cut	≤0.2D (D<ϕ3) ≤0.5D (D≥ϕ3)  ≤1D D:Dia.			

Slotting

Work material	Aluminum alloy A7075		Aluminum cast AC4B	
Cutting speed	240m/min		200m/min	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40,000	460	40,000	350
2	38,000	850	32,000	550
3	25,000	950	21,000	600
4	19,000	1,000	16,000	650
5	15,000	1,000	13,000	700
6	13,000	1,100	11,000	750
8	9,500	1,200	8,000	800
10	7,600	1,200	6,400	800
12	6,400	1,200	5,300	800
16	4,800	1,000	4,000	720
20	3,800	970	3,200	660
Depth of cut	D  ≤1D (MAX. 12mm) D:Dia.			

1) If the rigidity of the machine or the work material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) For milling of GFRP, please reduce the revolution and feed rate to 50% of the table figure (Al-alloy).
   Please adjust the depth of cut according to the quality of GFRP.
4) Water-soluble cutting fluid is recommended.
5) Climb cut is recommended for side milling.

JQA-2522
JQA-EM0941

MITSUBISHI MATERIALS KOBE TOOLS

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