

Housing rib (Electrode) model milling

Model : DLCLB Material : A7075 (Extra Super Duralumin)



The copper condition of DLCLB is recommended.

Cycle time : 7hr 31min 29sec
 No. of tools : 8 pcs
 Coolant : Water soluble (Nozzle)
 Work size : 50 x 50 x 50 mm



No.	Process		Tool	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	a _e (mm)	Allowance (mm)	Cycle Time
1	Roughing	-	DLCLB 2030-100 (R1.5 x EL10)	15,000	2,550	0.6	1.2	0.1	0:17:49
2		-	DLCLB 2015-060 (R0.75 x E6)	25,500	2,040	0.3	0.6	0.1	0:20:22
3	Semi-Finishing	Flat area	DLCLB 2020-060 (R1 x EL6)	18,700	2,080	0.05	0.1	0.05	0:25:06
4		Convex area Pocket	DLCLB 2010-050 (R0.5 x EL5)	30,000	1,710	0.05	0.06	0.05	0:53:17
5		Corner	DLCLB 2008-060 (R0.4 x EL6)	30,000	1,000	0.06	0.06	0.05	0:17:02
6	Finishing	Flat area	DLCLB 2020-060 (R1 x EL6)	18,700	2,080	0.05	0.04	0	1:06:03
7		Convex area Pocket	DLCLB 2010-050 (R0.5 x EL5)	30,000	1,710	0.05	0.028	0	1:31:32
8		Cylinder pocket Corner	DLCLB 2006-050 (R0.3 x EL5)	29,500	650	0.0002 (Cusp height)	0.0002 (Cusp height)	0	2:40:18

The point of tool selection for milling aluminum

Q. What should we be careful about when processing aluminum alloys ?

A. Please note that it is soft and **highly malleable and viscous, so easy to adhere.**



Q. Which ball end mill is suitable?

A. The characteristics required are :

1. **Sharp cutting edge** that suppresses cutting resistance so as not to raise the cutting temperature.
2. **Coating with low affinity** with aluminum alloys.

Required characteristic	<u>Copper</u>	Graphite	Raw steels	Hardened steels	Cemented carbide
1. Sharp edge	◎	○	○	x	x
2. Coating	◎ DLC	△ / ○ Non-coat / DIA	△ UTCOAT	x HARDMAX	○ UDC

DLCLB, which is for copper electrode, will be suitable!!

Let's Confirm by A7075 Housing-rib electrode model milling.

Conventional

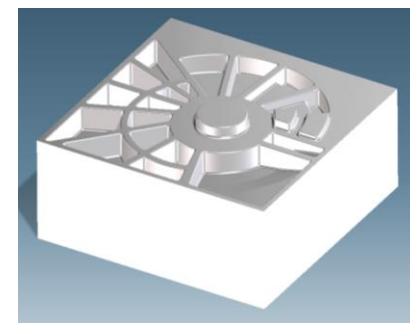
For steels (UTCOAT) Long neck ball



VS

DLCLB

For copper (DLC) Long neck ball



Housing-rib electrode model
Size : 50 x 50 x t25mm

Housing rib (Electrode) model milling

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The milling surface by DLCLB had no-adhesion and the smooth surface that reflects identifiable characters. From the result, DLCLB is suitable for milling aluminum.

DLCLB

Surface comparison

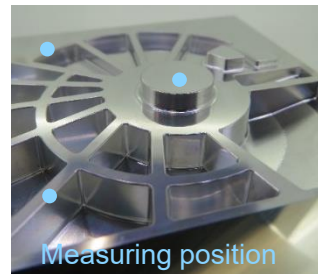


Reflection



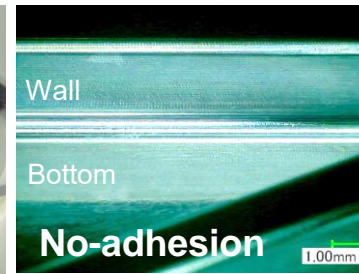
Glossy surface that can identify the characters in the reflected background.

Roughness

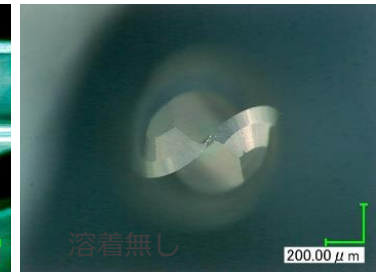


Ave.
Ra 0.03 μm

Corner of the work



After milling
R0.4×EFL6mm

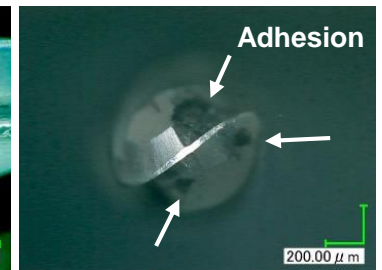
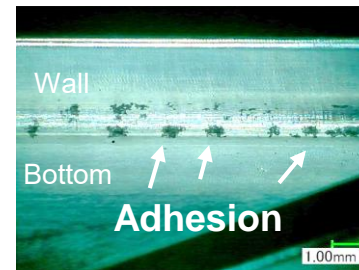


Conventional (UTCOAT)



The surface is matte and the characters cannot be identified.

Ave.
Ra 0.15 μm



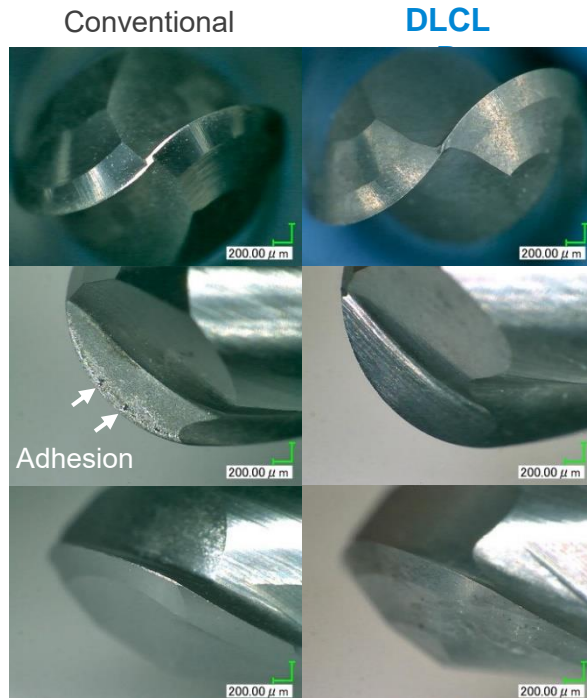
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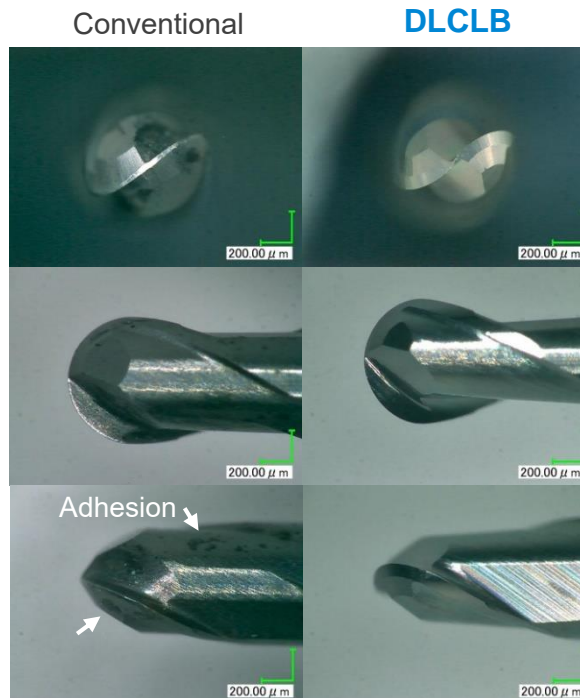
In roughing / semi-finishing, both the rake face and the relief face of DLCLB suppressed adhesion.
After 2hrs 40min of finishing, the tool wearing was small and the tool was still available.

～ Tools after milling ～

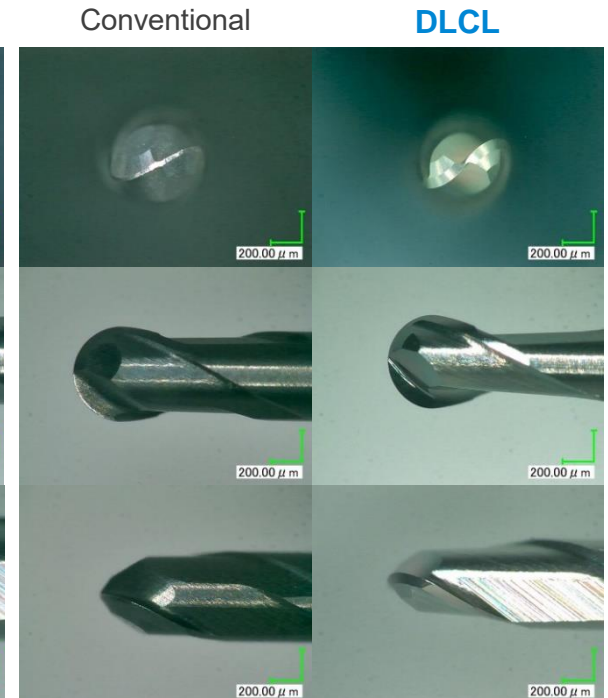
No.1 Roughing
R1.5 x EFL 10 mm
Cycle time : 17min 49sec



No.5 Semi-finishing
R0.4 x EFL 6 mm
Cycle time : 17min 02sec



No.8 Finishing
R0.3 x EFL 5 mm
Cycle time : 2hr 40min 18sec



* Conventional model is UTCOAT long neck ball for steels