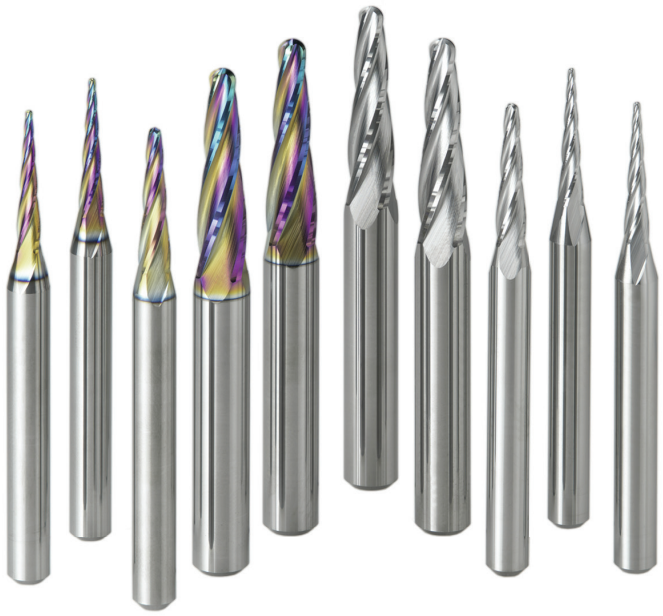
MITSUBISHI MATERIALS

DLC4LATB/C4LATB

TAPER BALL NOSE END MILLS FOR MACHINING ALUMINUM ALLOY IMPELLERS

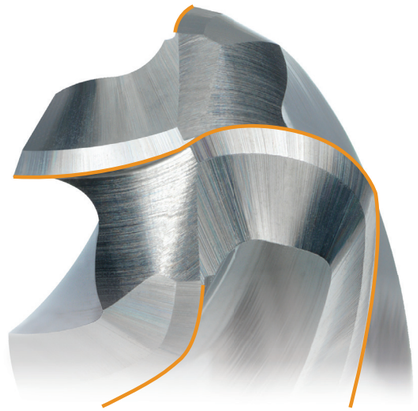


TOOL NEWS **B248A**

Taper Ball Nose End Mills for Machining
Aluminum Alloy Impellers

DLC4LATB/C4LATB

Featuring 4 peripheral flutes for strength and rigidity paired with only 2 ball end flutes for superior chip discharge.



— : Cutting Edge

A wide range of non-standard shapes are available. Please inquire for more information.

Ball Nose Taper End Mill
C4LATB

First Recommendation

NEW

DLC Coated Ball Nose Taper End Mill
DLC4LATB

The uniquely developed DLC coating provides excellent welding resistance during high speed machining and when the coolant supply is reduced. Additionally, the low coefficient of friction reduces cutting resistance.

Application Example

High Efficiency Machining of Aluminum Alloy Impellers

Excellent high depth of cut and feed.

Conventional

Breakage During Machining

C4LATB

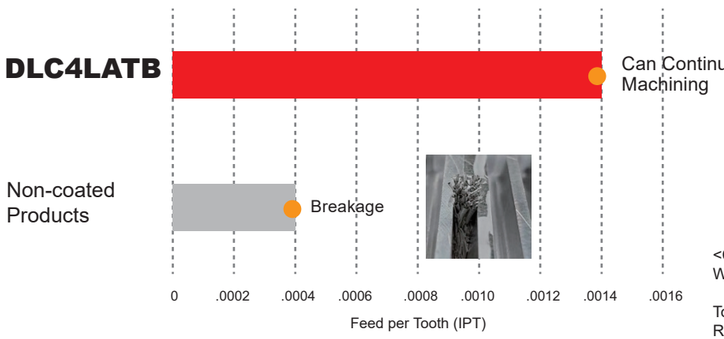
High Durability

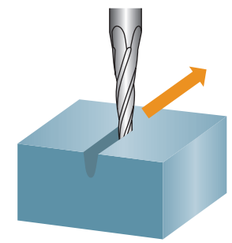
<Cutting Conditions>
Workpiece Material : Aluminum Alloy (A2618-T61)
Tool : C4LATBR100T040AP20
Revolution : 20000 min^{-1}
Max. Feed Rate : 78.74 IPM
Max. Depth of Cut : ap=.433 inch
Cutting Mode : Water Based
Machine : Vertical M/C

Cutting Performance

Slotting with a Limited Coolant Flow Rate

Resistance to welding prevents tool breakage when coolant supply is limited due to the geometry of the workpiece.





<Cutting Conditions>
Workpiece Material : Aluminum Alloy (A2618-T61)
Tool : DLC4LATBR100T040AP20
Revolution : 20000 min^{-1}
Feed per Tooth : fz=.0002- .0016 IPT
Depth of Cut : ap=.394 inch
Cutting Mode : Water Based
Machine : Vertical M/C (BT30)

DLC4LATB

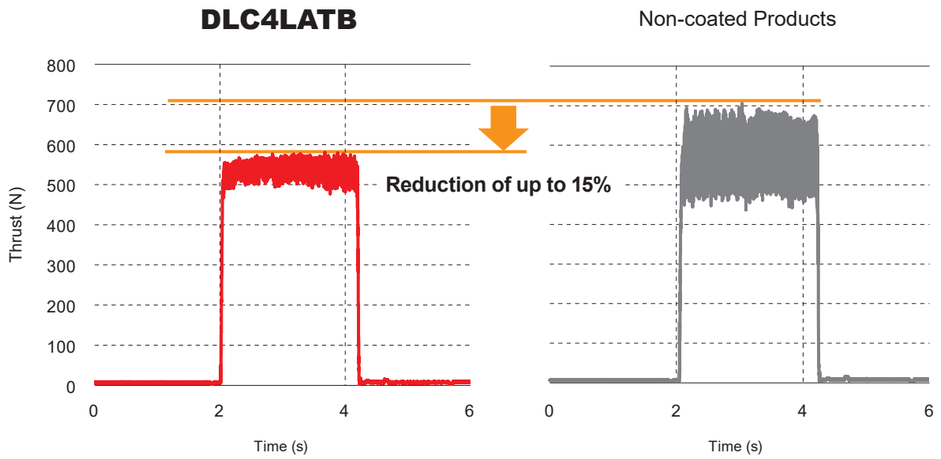
Non-coated Products

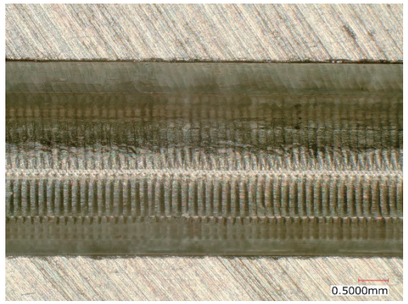
This test was performed with a limited coolant flow rate. If the coolant flow rate is sufficient, non-coated end mills can also be used.

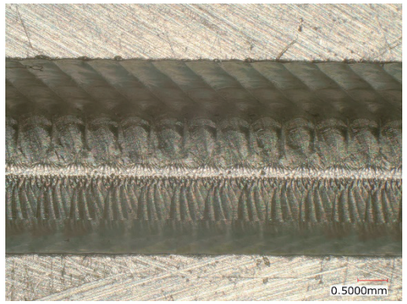
Cutting Performance

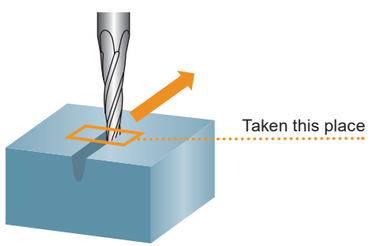
Comparison of Cutting Resistance when Slotting

Cutting resistance has been reduced by up to 15% compared to non-coated products.









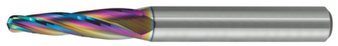
<Cutting Conditions>
Workpiece Material : Aluminum Alloy (A2618-T61)
Tool : DLC4LATBR100T040AP20
Revolution : 20000min-1
Feed per Tooth : fz=.0014 IPT
Depth of Cut : ap=.394 inch
Cutting Mode : Wet Cutting (Emulsion) External Coolant
Machine : Vertical M/C (BT30)

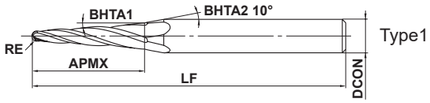
DLC4LATB NEW

Ball nose taper end mill, Long cut length, 4 flute, For aluminum impellers

UWC DLC γ 20°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
							◎





Type1

Type2

RE≤2					
± 0.010					
±5'					
DCON=6	DCON=8				
h6 0 - 0.008	0 - 0.009				

- The high-rigidity design with improved breakage resistance achieves high-efficiency machining of aluminum alloy impellers.
- High resistance to welding when there is an insufficient coolant supply or during high-speed cutting.

(mm)

Order Number	RE	BHTA1	APMX	LF	DCON	* No.F	Stock	Type
DLC4LATBR050T040AP20	0.5	4°	20	70	6	4	●	1
DLC4LATBR100T040AP20	1	4°	20	70	6	4	●	1
DLC4LATBR150T040AP20	1.5	4°	20	75	8	4	●	1
DLC4LATBR200T040AP30	2	4°	30	75	8	4	●	2

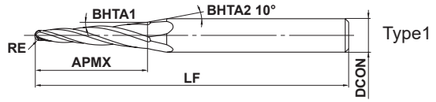
* Number of Flutes
Note 1) A wide range of non-standard shapes are available. Please inquire for more information.
(ex.: RE sizes starting from a minimum of R0.3, half included taper angles) or coatings.

● : USA Stock

C4LATB

Ball nose taper end mill, Long cut length, 4 flute, For aluminum impellers

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
							◎



RE≤2					
± 0.010					
±5'					
DCON=6	DCON=8				
0 - 0.008	0 - 0.009				

- The high-rigidity design with improved breakage resistance achieves high-efficiency machining of aluminum alloy impellers.
- First recommended for machining aluminum alloy impellers.

(mm)

Order Number	RE	BHTA1	APMX	LF	DCON	* No.F	Stock	Type
C4LATBR050T040AP20	0.5	4°	20	70	6	4	●	1
C4LATBR100T040AP20	1	4°	20	70	6	4	●	1
C4LATBR150T040AP20	1.5	4°	20	75	8	4	●	1
C4LATBR200T040AP30	2	4°	30	75	8	4	●	2

* Number of Flutes
Note 1) A wide range of non-standard shapes are available. Please inquire for more information.
(ex.: RE sizes starting from a minimum of R0.3, half included taper angles) or coatings.

RE = Radius of Ball Nose
BHTA1 = Taper Angle
APMX = Length of Cut
LF = Functional Length
DCON = Shank Dia.

● : USA Stock

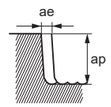
DLC4LATB/C4LATB

Ball nose taper end mill, Long cut length, 4 flute, For aluminum impellers

Recommended Cutting Conditions

■ Side Milling

(inch)

Workpiece Material	Aluminum Alloys				
RE (mm)	RE (inch)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
0.5	**.020**	20000	78.7	.591	.030
1.0	**.039**	20000	157.5	.591	.059
1.5	**.059**	20000	204.7	.591	.089
2.0	**.079**	20000	204.7	.906	.118
Depth of Cut					

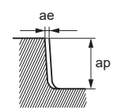
■ Slotting

(inch)

Workpiece Material	Aluminum Alloys			
RE (mm)	RE (inch)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap
0.5	**.020**	20000	23.6	.394
1.0	**.039**	20000	110.2	.394
1.5	**.059**	20000	157.5	.394
2.0	**.079**	20000	157.5	.591
Depth of Cut				

■ Side Milling (Finishing)

(inch)

Workpiece Material	Aluminum Alloys				
RE (mm)	RE (inch)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
0.5	**.020**	20000	31.5	.709	.004
1.0	**.039**	20000	78.7	.709	.008
1.5	**.059**	20000	94.5	.709	.012
2.0	**.079**	20000	94.5	1.063	.012
Depth of Cut					

Case Examples for Non-standard Shapes

Note 1) Water-soluble cutting fluid is recommended.
Note 2) Climb cutting is recommended for side milling.
Note 3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.

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FOR YOUR SAFETY

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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