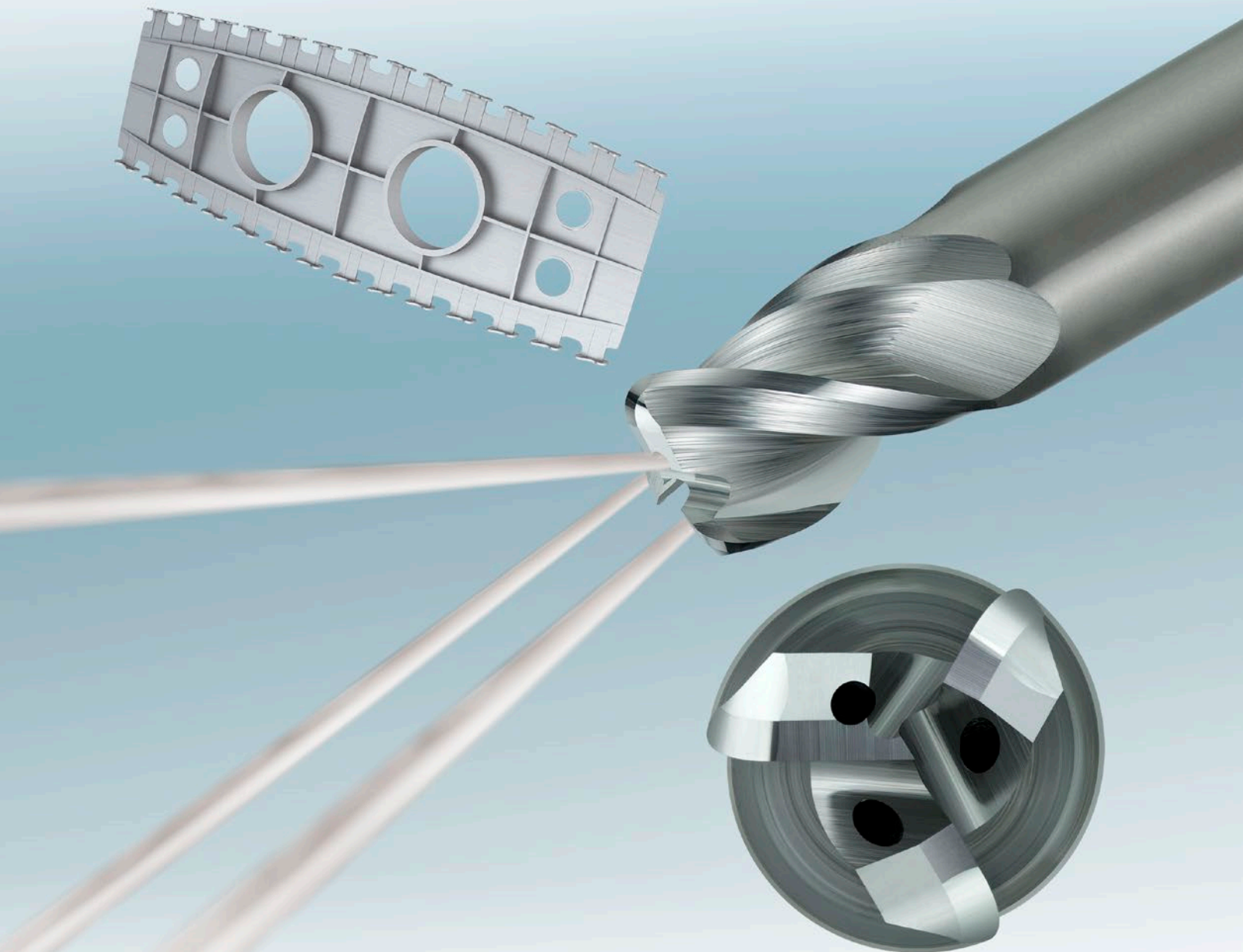


High Efficiency Machining of Aluminum Alloys

*New* **Alimaster**

New  
Products

**Optimized Cutting Edge Geometry and Thru-Coolant Holes. Ideal for Ultra Efficient Machining of Aluminum Alloys**

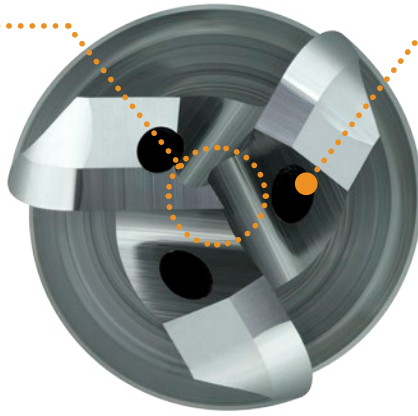


# New **Alimaster**

Helical internal thru-coolant holes combined with an optimized cutting edge geometry enables highly efficient machining.

## Strengthened Center Cutting Edges

Optimized center cutting edges provide strength and reliability even when plunging.



## Helical Coolant Holes

Chip discharge during plunging, ramping and grooving have been significantly improved, for stable, high efficiency cutting. Helical holes maintain a stable coolant supply even after re-grinding.

## Ideal Flute Geometry

The cross sectional geometry of the flutes is perfect for efficient chip discharge and prevents chip jamming commonly associated with high feed machining of aluminum.

Square End Mill, 3 Flute

**A3SA**

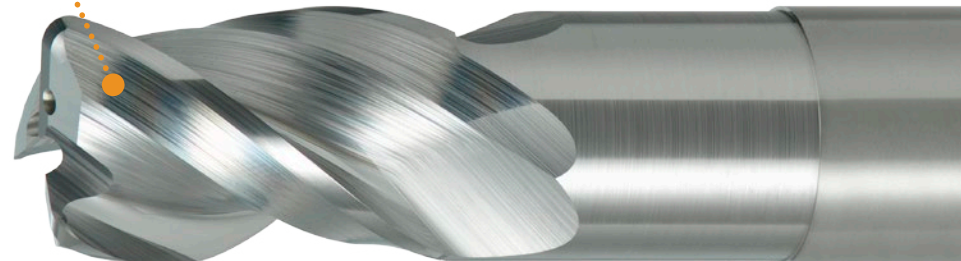


## Irregular Helix and Curved Flute Exit Geometry

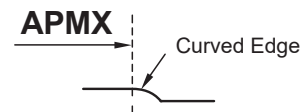
Suppresses chatter to enable excellent surface finishes.

Radius End Mill, 3 Flute

**A3SARB**









## Radius Flute Exit Geometry



# Cutting Performance

## Comparison of Fracture Resistance - Machining of Slots in A7050

Utilising internal coolant and optimized cutting edge geometry enables double the efficiency levels of conventional products.

	Feed Rate (IPM)	Feed per Tooth (IPT)		
<b>New Alimaster</b>	<b>100.4</b>	<b>.013</b>		✓ Good Wall Surface
	<b>118.9</b>	<b>.015</b>		✓ Good Wall Surface
	<b>137.8</b>	<b>.017</b>		✓ Good Wall Surface
Conventional A				✓ Good Wall Surface
				✗ Breakage due to chip clogging
Conventional B				✗ Breakage due to chip clogging

<Cutting Conditions>  
 Workpiece Material : A7050  
 Tool : A3SA120N36C  
           DC =  $\varnothing$ .472 inch  
 Cutting Speed : vc = 330 SFM  
 Depth of Cut : ap = .472 inch  
 Overhang Length : 1.417 inch  
 Cutting Mode : Internal Coolant  
                   (Water-soluble Coolants)

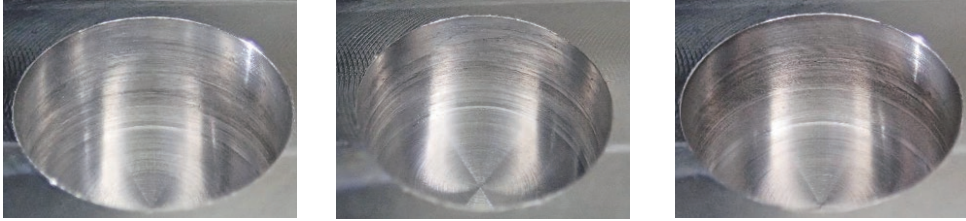
## Cutting Performance

### Comparison of Fracture Resistance - Plunge Machining of A7050

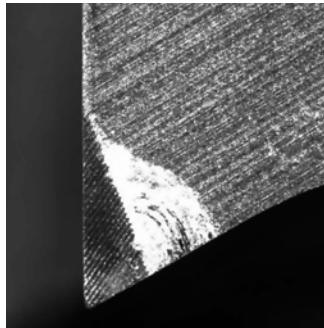
Higher feed rates than conventional products brings greater machining efficiencies.

	40.9	50.4	59.8
Feed Rate (IPM)	40.9	50.4	59.8
Feed per Rev. (IPT)	.005	.006	.007

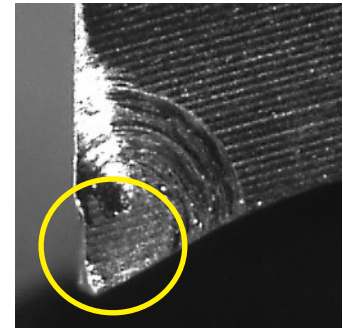
*New* **Alimaster**



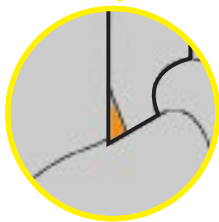
After F = 59.8 IPM, fz = .007 IPT Plunging



*New* **Alimaster**



Conventional Fracture



Strengthened Center Cutting Edges

<Cutting Conditions>

Workpiece Material : A7050

Tool : A3SA120N36C

DC =  $\varnothing$ .472 inch

Cutting Speed : vc = 985 SFM

Depth of Cut : ap = .472 inch

Overhang Length : 1.417 inch

Cutting Mode : Internal Coolant

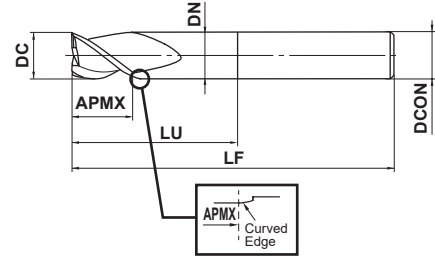
(Water-soluble Coolants)

# A3SA NEW

End mill, Short cut length, 3 flute, with multiple internal thru-coolant holes



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
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	DC=12	DC>12			
	0 - 0.020	0 - 0.030			
	12≤DCON≤16	20≤DCON≤25			
	0 - 0.011	0 - 0.013			

- Stability and reliability even when slotting, ramping and plunging.
- The cross sectional geometry of the flutes is perfect for efficient chip discharge.

(mm)

Order Number	DC	APMX	LU	DN	LF	DCON	* No.F	Stock
A3SA120N36C	12	18	36	11.4	80	12	3	●
A3SA160N48C	16	24	48	15.4	90	16	3	●
A3SA200N55C	20	30	55	18	100	20	3	●
A3SA250N55C	25	37.5	55	23	100	25	3	●

\* Number of Flutes

**DC** = Dia.  
**APMX** = Length of Cut  
**LU** = Neck Length  
**DN** = Neck Dia.  
**LF** = Overall Length  
**DCON** = Shank Dia.

● : USA Stock





# A3SA/A3SARB

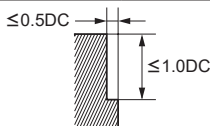
## Recommended Cutting Conditions

### Side Milling

(inch)

Workpiece Material		Aluminum Alloys	
Dia. DC		Revolution (min <sup>-1</sup> )	Feed rate (IPM)
(mm)	(inch)		
<b>12</b>	<b>.472</b>	≤33000	≤590.6
<b>16</b>	<b>.630</b>	≤33000	≤787.4
<b>20</b>	<b>.787</b>	≤33000	≤1023.6
<b>25</b>	<b>.984</b>	≤33000	≤1259.8

Depth of cut		DC: Dia.
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Note 1) Water-soluble cutting fluid is recommended.

Note 2) Climb milling is recommended for side cutting.

Note 3) When machining with a large tool length protrusion, adjust the the speed, feed and depth of cut as necessary.

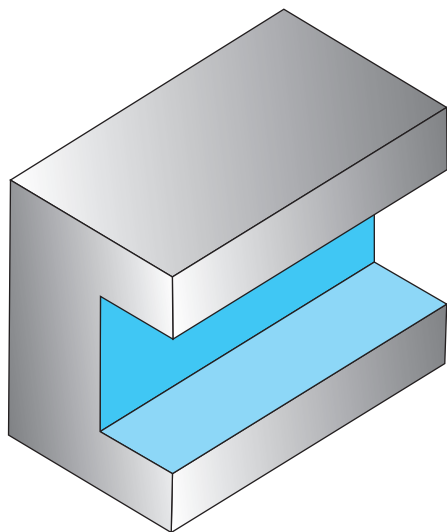
Note 4) If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately within the range described in the above table, or reduce the depth and width of cut.

## Cutting Example

### Machining with a High-speed, High-output Horizontal 5-axis Machining Center

Ultra-high efficiency processing was achieved with a stable chip discharge and no chattering.

Metal Removal Rate of 10,000cm<sup>3</sup>/min (>600 in<sup>3</sup>/min)



#### <Cutting Conditions>

Workpiece Material : A7050

Tool : A3SARB250R300N55C  
DC = ø25 mm (.984 inch)  
RE=3.0 mm (.118 inch)

Spindle Revolution : 33000min<sup>-1</sup>

Cutting Speed : vc = 2600m/min (8530 SFM)

Feed Rate : f = 25000mm/min (984 IPM)

Feed : fz = 0.25mm/t. (.010 IPT)

Depth of Cut : ap = 16mm (.630 inch)

ae = 25mm (.984 inch)

Cutting Mode : Internal Coolant  
(Water-soluble Coolants)

Machine : For machining aluminum  
structural parts for aircraft  
High-speed, high-output  
horizontal 5-axis M/C

#### 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 using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tool specifications subject to change without notice.)