

# H2005 5% Beryllium-Aluminum

- Fast dissolving • Greater accuracy and precision
- Reduced alloying element oxidation • Better resistance to magnesium fade
- Improved mechanical properties

Beryllium is added to aluminum alloys containing reactive alloying elements to prolong their presence in the bath. It offers the melter a means of:

1. Economizing on expensive melt treatment and alloying additives.
2. Improving the process control over these expensive additives.
3. Increasing the longevity of the treated bath.
4. Improving the mechanical properties of a casting through shape control of the iron-bearing micro-constituents.

By adding beryllium, elements prone to oxidation (such as magnesium, strontium and sodium) will not be lost so quickly in an aluminum alloy containing

between 0.005 and 0.05% beryllium as in a beryllium-free bath. The slight beryllium addition will generate a change in the surface oxide layer of the molten bath which retards the ability of the atmospheric oxygen to oxidize the reactive elements. The degree of oxidation protection depends on the bath temperature, alloy content and beryllium content.

At higher beryllium concentrations (0.1 to 0.3%), the beryllium will affect the microstructural shape of FeAl<sub>3</sub> and Fe-Si-Al phases from needle-like to plate-like particles. The result is improved tensile properties and increased ductility with reduced notch-sensitivity of the alloy.

The 5% Be-Al will alloy effectively in the temperature range of 1280° to 1450°F. As the temperature and the exposure of the bath surface to oxygen (air) increase, the working life of the beryllium addition decreases.

The addition of 5% Be-Al should be made immediately before the addition of other reactive alloying agents. The Be-Al should be added to disseminate the beryllium as much as possible, with violent mixing and excessive surface splashing avoided after the beryllium addition.

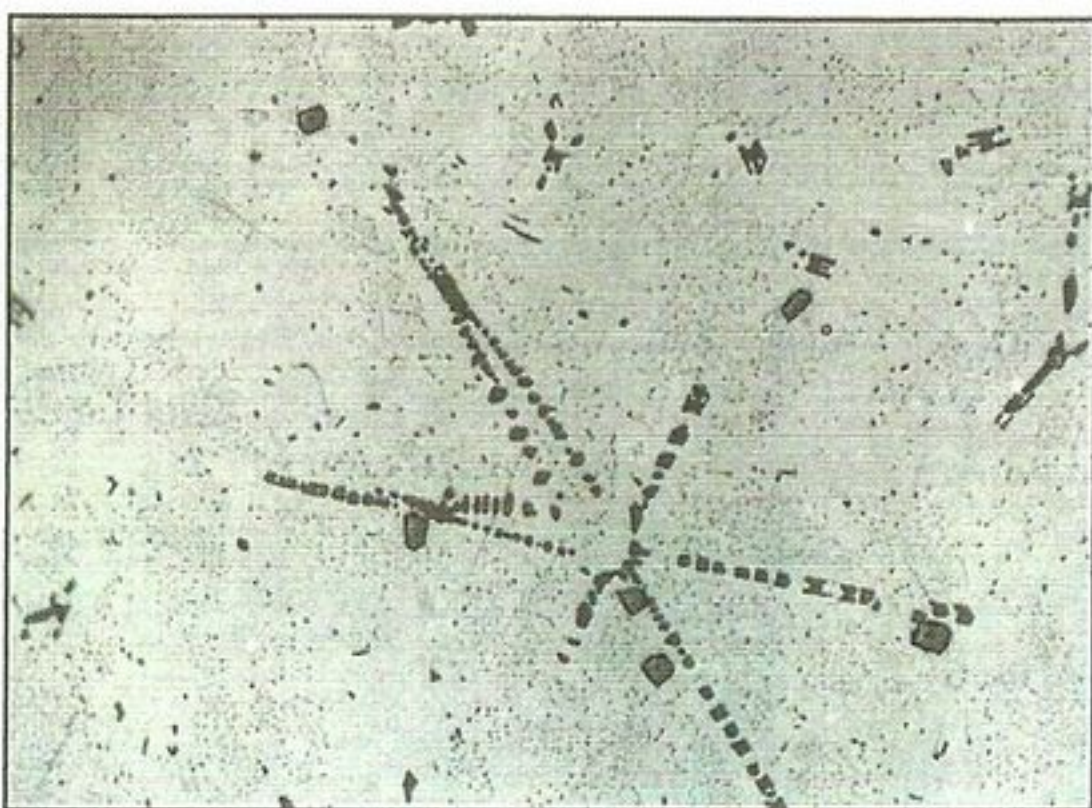
Practical melters have long experienced the advantages of adding 5% beryllium-aluminum to aluminum and magnesium alloys. By consulting the appropriate industrial hygiene, hazardous material and material safety data sheet (MSDS) references and ensuring the necessary precautions are followed, the benefits of using the 5% beryllium-aluminum master alloy will be achieved safely and effectively.

## Physical Properties

	Al	Be	5% Be-Al
Melting Temperature	1220°F	2352°F	1191° - 1292°F
Density (g/cc)	2.4 liquid	1.85 solid	2.65 solid

## Chemical Properties

H2005	Composition Element (in percent)								
	Be	Fe	Si	Mg	Mn	Ni	Ti	Zn	Other
Maximum	6.0	0.40	0.20	0.50	0.02	0.02	0.02	0.10	0.05
Minimum	4.5	—	—	—	—	—	—	—	—
Typical	5.0	0.1	0.06	0.04	<0.01	<0.01	<0.01	<0.01	<0.01



5% beryllium-aluminum, 100x, dilute Keller's etch. The dark gray starburst particles and the fine precipitate are  $\alpha$  Be. The matrix is aluminum.

## Forms Available

- 16 lb. Waffles
- 1 lb. Cut Pieces
- 4 oz. Acu-Stix
- 3/8" Coiled Rod

## *Milward Alloys, Inc.*

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500 Mill Street, Lockport, NY 14094-1712 USA • (716) 434-5536 • FAX (716) 434-3257