

H2251 5% Titanium-1% Boron-Aluminum

8 Advantages

of Using 5% Ti-1% B-Al Master Alloy for Grain Refining Aluminum Foundry Alloys

Foundrymen have learned that the added raw material cost of grain refiners is outweighed by productivity and quality improvements such as:

1. Improved feeding.

By reducing the crystal size of the solidifying casting, the restriction to final metal flow during the last stages of solidification is reduced, resulting in improved soundness and surface finish.

2. Reduced chemical segregation.

A finer crystal size reduces the effects of microsegregation and coring. A uniform crystal distribution enhances mechanical properties and response to heat treatment.

3. Increased pressure tightness.

By increasing the number of grains, any microporosity in the casting is more widely distributed, with a resulting reduction in the number and size of individual pores. The net result is increased pressure tightness.

4. Reduced hot tearing.

Fine grain castings will distribute and relieve stresses due to solidification shrinkage and thermal contraction better than coarse grain castings.

5. Improved mechanical properties.

The tensile and elongation properties of a grain refined casting are improved, especially in heavy sections.

6. Improved machinability.

Fine grain structures allow better surface finishes on machined surfaces. Reduced machine chatter and fewer tear-outs improve tool life and result in smoother finishes.

7. Better response to finishing.

By reducing the crystal size and improving the constituent particle distribution, the reflectivity of the casting is increased for better anodizing and polishing applications.

8. Elimination of salt inclusions.

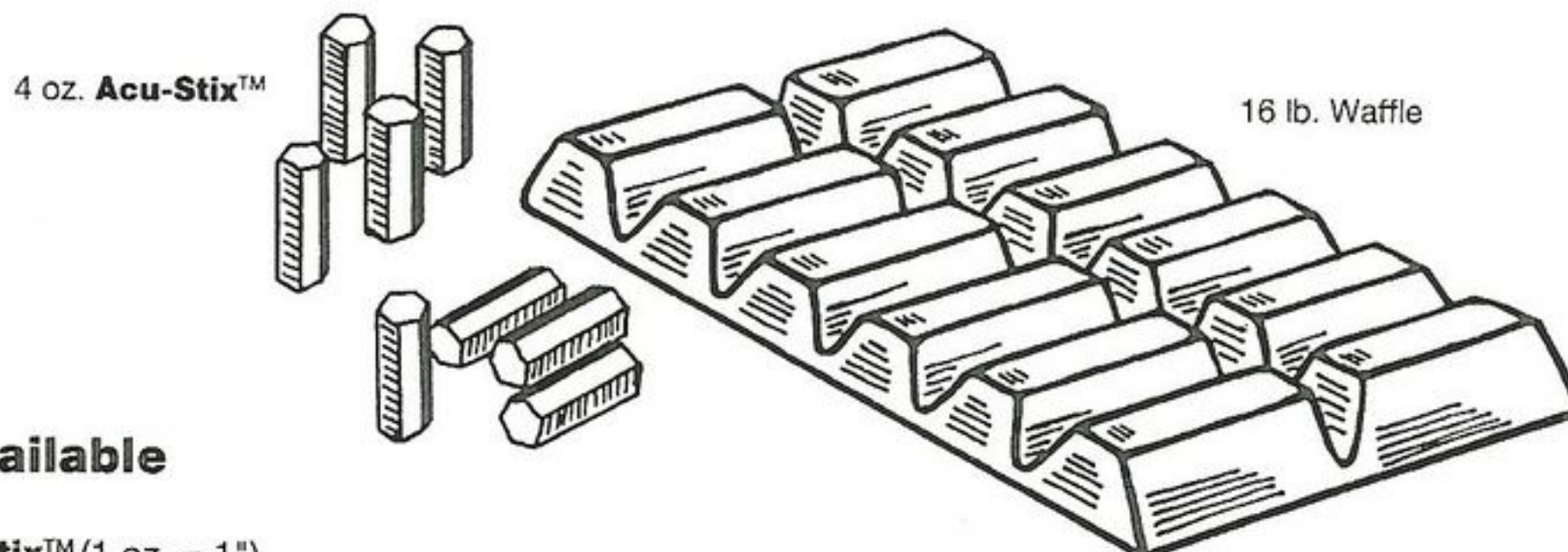
The use of all metallic grain refiners avoids the presence of fluoride/oxide inclusions and the refractory attack that flux additions produce. It provides improved predictability over salt flux refiners.

As a general rule, 5% titanium-1% boron-aluminum master alloy is the most potent and reliable additive for general use in grain refining aluminum foundry alloys.

Grain refiners should be added to the furnace or ladles close to the end of the processing cycle after the molten metal purification, degassing and filtration processes. A good starting titanium addition is 0.015 to 0.03%. The amount of grain refiner needed to produce optimal castings is often determined empirically. The rule **if a little is good, a lot is not necessarily better** applies absolutely.

Since grain refinement is a function of the number and size of nuclei, the chemical recovery of the titanium is not the best factor to measure the quality of the process. However, about 95% of the added titanium is recovered.

4 Easy & Convenient Choices for 5% Ti-1% B-Al Master Alloy Addition



Forms Available

16 lb. Waffle
4-8 oz. **Acu-Stix**TM (1 oz. = 1")
1 oz. Cut Rod
Coiled Rod

Milward Alloys, Inc.

Quality, Innovation & Excellence Since 1948

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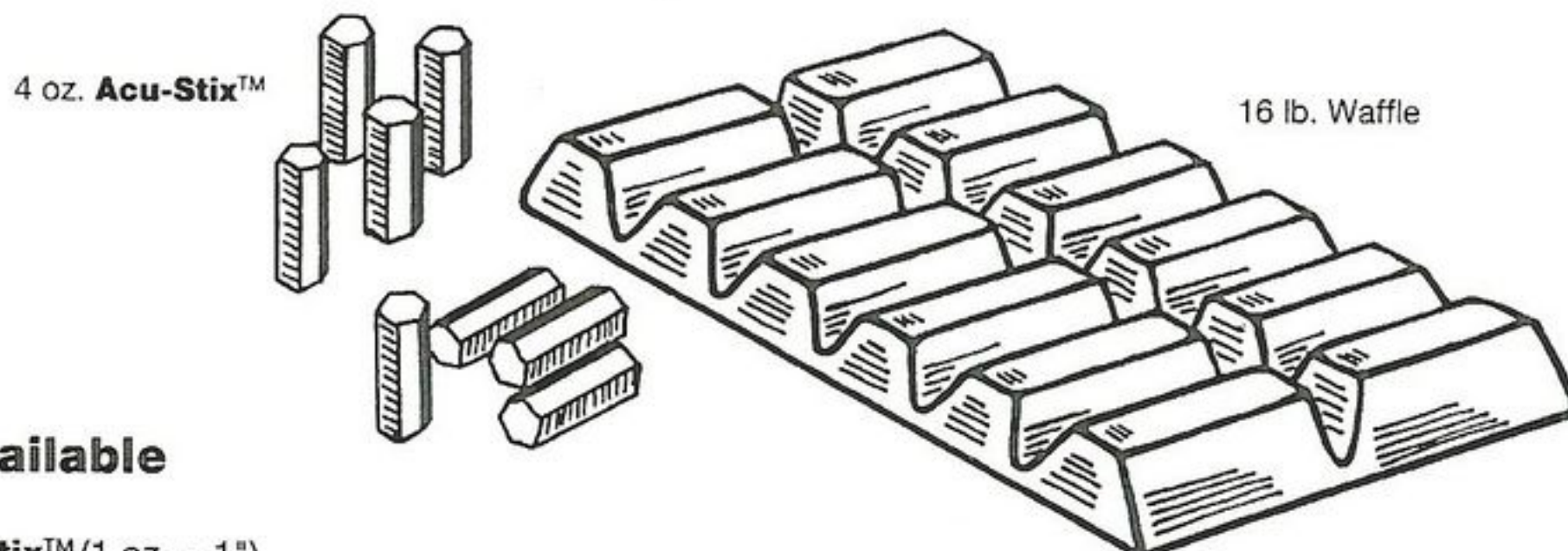
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