ALUMINIUM GRAIN REFINERS

ALEASTUR
ASTURIANA DE ALEACIONES S.A.

The control of grain refinement is an essential process in the aluminium casting industry. The initial procedure for obtaining grain refinement for aluminium is based on the introduction of Ti metal or salts (KBF4, K2TiF6) which is subsequently introduced to molten aluminium. Nowadays, these practices have been replaced by the addition of AlTiB alloys.

Because the rod is typically innoculated in the launder, cleanliness of the refiner is critical in maximizing the quality of the final product. Therefore the efficiency of the rod is equally as important as the metallographic structure.

The use of AlTiB alloys as grain refiners will provide the following advantages to Aluminium alloy:

- High fluidity allowing faster casting speeds
- Better homogeneity of the alloy and uniformity of the structure
- Reduction of the crack tendency during solidification
- Improvement of surface quality
- Enhancement of mechanical properties

MICROSTRUCTURE

AlTiB alloys contain the particles TiAl3 and TiB2 uniformly dispersed in an aluminium matrix. The combination of TiB2 as nucleation particles with the Ti from the TiAl3 in the aluminium melt is the origin of refinement.The TiB2 phase is sized between 0.5 and 2 microns. Under an electron microscope examination, it can be observed that these particles are actually formed by smaller crystals with an average size range between 0.1 and 0.2 microns. The TiB2 particles are insoluble and are quickly and uniformly distributed in the melt after addition. The average size of the TiAl3 phase is 30 microns but dispersed crystals may be found at 90 microns maximun. These particles will be dissolved very fast in the aluminium melt, disappearing as phase in the solidified alloy.

AlTi5B1 Structure

ASTURIANA DE ALEACIONES, S. A.
Pol. Industrial de Maqua, s/n
Apdo. Correos 371 (P. O. Box 371)
33400 AVILES - ASTURIAS
ESPAÑA (SPAIN)
+34 98 5129038
+34 98 5548969
e-mail: aluminium@aleastur.com

http://www.aleastur.com

PRODUCT RANGE
ALLOY

AlTi3B0.2

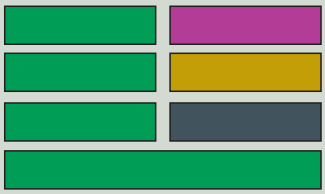
AlTi3B1

AlTi5B0.2

AlTi5B1

Format Available: Rod, Conti-Bar and Waffle Plate
All of our alloys are produced from 99.7% Purity Aluminium

COLOUR CODE



Other Ti:B ratios are also available

QUALITY
INFORMATION PROVIDED

Following inspections are carried out for every batch:

- Grain Refining Test
- Physical Test
- Chemical Analysis
- Metallographic Examinations:

  - Phase Size (TiB2, TiAl3)
  - Phase Distribution (TiB2, TiAl3)
  - Agglomerations | Clusters
  - Oxides | Inclusions
  - Banding
  - Streaking

SPC related to above data are available for our customers on request.

ALEASTUR
AlTiB ALLOYS PERFOMANCE

Chosen ratio and addition rate will depend on many factors, such as the alloy to be treated, percentage of recycled aluminium, required grain size, production process, etc.

The minimum contact time to get good refinement of the aluminium is 15 seconds, providing highest efficiency 60 seconds after addition.

Primary Aluminium (Grain Size 2000µ)

Primary Aluminium refined with AlTi5B1 (*) (Grain Size 100µ)

(*) Grain Refining Test TP1 AA, 0.2% AlTiB with 2 minute contact time

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