










Aluminum Grain Refiners

Aluminum's mechanical and physical properties are enhanced with the use of alloying elements. These alloying elements are commonly referred to as hardeners. Aluminum based master alloys which contain the hardener elements in high concentrations, provide a convenient and economical way to add them to aluminum to achieve desired properties. These master alloys readily go into solution at lower liquid aluminum temperatures, thus minimizing dross formation and solubility of hydrogen. Lower furnace temperatures also mean reduced energy consumption and longer furnace life.

TIBOR® Titanium Boron Aluminum

Alloy	Composition Limits Maximum unless shown as a range					Aluminum Association Color Coding	Form
1.7% Ti 1.4% B	Ti 1.3-2.2 B 1.1-1.7	Si 0.2 Fe 0.3 V 0.05	Others Each Total	0.03 0.1			Waffle Ingot Rod Buttons
3% Ti H2220 0.2% B	Ti 2.7-3.3 B 0.15-0.25	Si 0.2 Fe 0.3 V 0.15	Others Each Total	0.03 0.1	 1 green / 1 purple		Waffle Ingot Rod
3% Ti H2214 1% B	Ti 2.8-3.4 B 0.7-1.1	Si 0.2 Fe 0.3 V 0.15	Others Each Total	0.03 0.1	 1 green / 1 brown		Waffle Ingot Rod
5% Ti H2201 0.1% B	Ti 4.5-5.5 B 0.1-0.2	Si 0.2 Fe 0.35 V 0.25	Others Each Total	0.03 0.1	 1 green / 1 red		Waffle Ingot Rod
5% Ti H2207 0.2% B	Ti 4.5-5.5 B 0.15-0.25	Si 0.3 Fe 0.35 V 0.25	Others Each Total	0.03 0.1	 1 green / 1 black		Waffle Ingot Rod Buttons
5% Ti H2202 0.6% B	Ti 4.5-5.5 B 0.5-0.27	Si 0.2 Fe 0.3 V 0.2	Others Each Total	0.03 0.1	 1 green / 1 yellow		Waffle Ingot Rod
5% Ti H2252 1% B	Ti 4.5-5.5 B 0.8-1.2	Si 0.2 Fe 0.3 V 0.2	Others Each Total	0.03 0.1	 1 green		Waffle Ingot Rod Buttons
10% Ti H2211 1% B	Ti 9-11 B 0.9-1.5	Si 0.3 Fe 0.35 V 0.5 Ni 0.05	Others Each Total	0.03 0.15	 1 green / 1 white		Waffle Ingot