ALUMINUM ZIRCONIUM

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.

Zirconium is added to certain aluminum-magnesium alloys such as 7050 to reduce stress corrosion susceptibility. Zirconium additions in the range of 0.1 to 0.3% form fine precipitates of intermetallic particles that inhibit recovery and recrystallization. Zirconium is added to aluminum zinc magnesium alloys to increase recrystallization temperature and control grain structure in wrought alloys. Additions of zirconium to 7XXX alloys are less quench sensitive than chromium additions. Higher levels of zirconium are employed in some superplastic alloys to retain a fine substructure during elevated-temperature forming. Zirconium additions have been used to reduce the as-cast grain size, but its effect is less than that of titanium.

Alloy	Designation	Color Code	Chemical Composition (maximum unless shown as a range)										Form
			Zr	Si	Fe	Ti	Ni	Sn	Cu	B	Others Each	Others Total	
5% Zr	AA-H2607		4.5-5.5	0.30	0.30					0.01	0.04	0.10	Waffle Ingot
	CEN-94000		4.5-5.5	0.30	0.30						0.04	0.10	
6% Zr	AA-H2606		5.5-6.5	0.20	0.25	0.05					0.03	0.10	Waffle Ingot
10% Zr	AA-H2600		9.0-11.0	0.20	0.25	0.05					0.03	0.15	Waffle Ingot
	CEN-94002		9.0-11.0	0.30	0.30						0.04	0.10	
10% Zr	AA-H2612		9.0-11.0	0.30	0.45	0.20	0.20	0.20	0.20		0.05	0.15	Waffle Ingot
	CEN-94003		9.0-11.0	0.30	0.45	0.20	0.20	0.20	0.20		0.05	0.15	
15% Zr	AA-H2615		13.5-16.0	0.35	0.35						0.05	0.15	Waffle Ingot
	CEN-94004		13.5-16.0	0.40	0.30						0.04	0.10	

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