

H2150 50% Copper-Aluminum

- **Faster, more complete copper recovery**
- **More efficient addition**
- **No intermetallic reaction**

Aluminum is alloyed with copper to enhance its strength using metallurgical thermal processing. Copper forms a broad eutectic system between 100% aluminum and about 53.5% copper. The aluminum rich end shows a maximum copper solid solubility of 5.65% at 1018°F. The copper rich end of the simple eutectic is bounded by the CuAl_2 intermetallic called θ (theta). The manipulation of the α (alpha) solution and the CuAl_2 (θ) precipitate is the basis of strengthening the aluminum.

Commercially pure copper will dissolve in molten aluminum. However, between pure copper and the θ phase

at 53.5% copper in aluminum, there are six possible intermetallics which may inhibit dissolution. Often when copper metal is added to aluminum, the rapid exothermic reaction of copper with aluminum forms intermetallics which exist as a "sticky" mass or ball of sludge which will dissolve slowly, requiring a considerable stirring of the bath.

A 50% Cu-Al master alloy is comprised of a θ CuAl_2 and saturated α aluminum. When the master alloy is added to the bath, there is no intermetallic reaction which may cause the "balling up" of the addition. Only the θ ,

which melts at 1095°F, and the α - θ eutectic, which melts at 1018°F, are present. Hence the master alloy practice adds only those phases which dissolve rapidly and result in rapid, complete copper additive recovery.

In summary, the use of a 50% Cu-Al master alloy offers the following advantages:

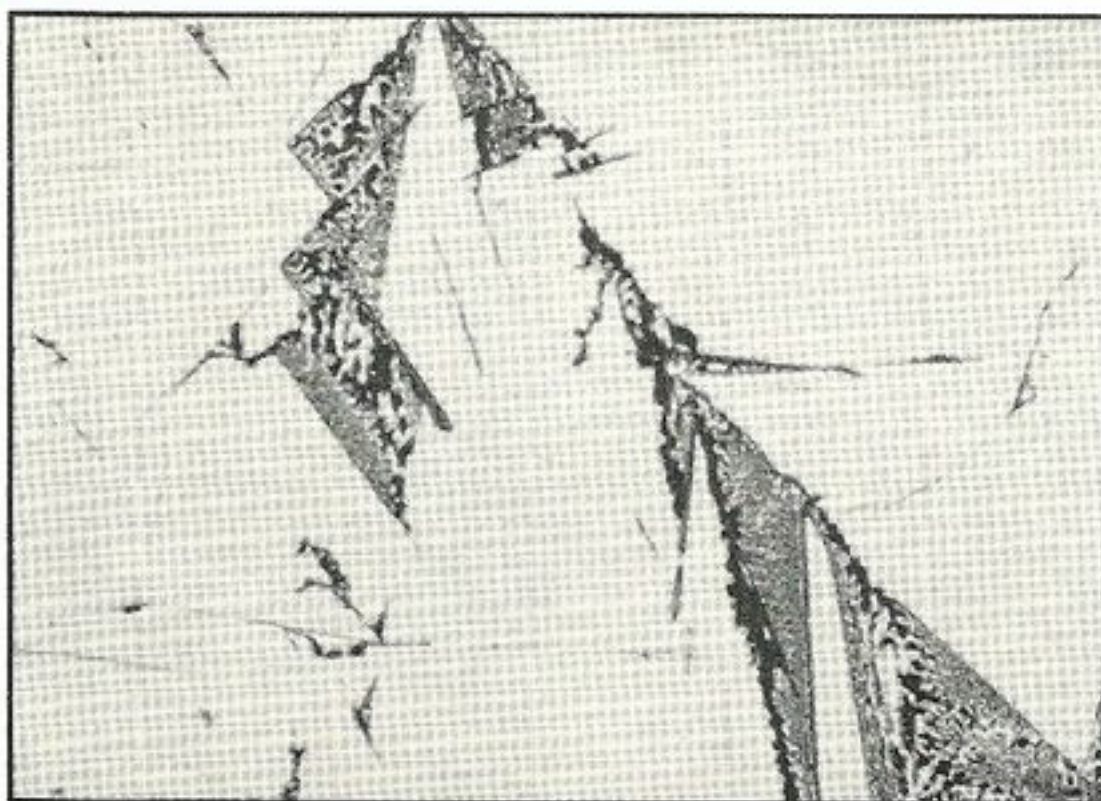
1. Rapid, reliable recovery of the copper addition.
2. Avoids copper build-up in the bottom of the furnace.
3. Eliminates the tramp impurities associated with merchant scrap.

Physical Properties

	Cu	Al	50% Cu-Al
Melting Temperature	1981°F	1220°F	1095°F
Density (g/cc)	8.96	2.7	4.1

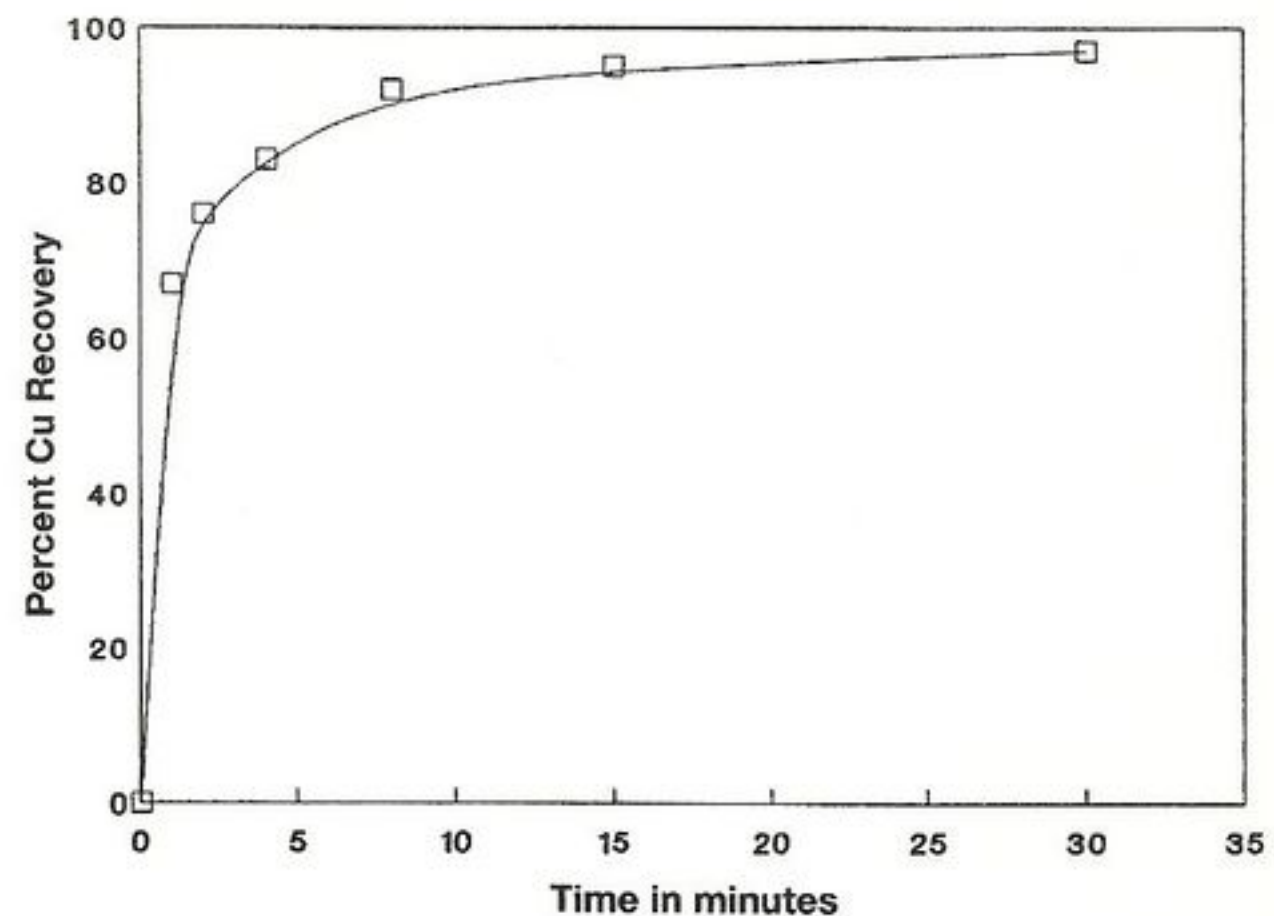
Chemical Properties

H2150	Composition Element (in percent)			
	Cu	Si	Fe	Others
Maximum	52.0	0.10	0.50	0.05
Minimum	48.0	—	—	—
Typical	50.0	0.08	0.22	—



50% copper-aluminum, 100x, dilute Keller's etch. The solid white phase is θ , CuAl_2 , surrounded by eutectic α - θ script (mottled gray phase).

Solution Rate of 50% Copper-Aluminum
5% Cu in 99.8% Al at 1335°F



Forms Available

- 24 lb. Waffles
- 24 lb. Notch Bars
- 54 lb. Ingots

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