

# COPPER BASE WELDING ALLOYS



## SILICON BRONZE ALLOY NO. 656

AWS A5.7-84 ERCuSi-A, AWS A5.27-85 RCuSi-A  
†ASME SFA5.7 ASME SFA 5.27 ERCuSi-A  
†QQ-R-571C, MIL-R-19631B TYPE MIL-RCuSi-A

### DESCRIPTION AND APPLICATIONS

Silicon Bronze is a copper based filler metal containing 3% silicon and small amounts of manganese, tin and zinc. Primarily used for MIG, TIG and oxy-acetylene welding of copper, copper-silicon and copper-zinc base metals to themselves and to steel. Excellent for plain or galvanized steel sheet metal as well as other coated steels. Silicon Bronze is also used for surfacing areas subjected to corrosion.

### FILLER METAL CHEMISTRY (%)

Cu	Balance
Zn	1.0 max.
Sn	1.0 max.
Mn	1.5 max.
Fe	0.50 max.
Si	2.8-4.0
Al	0.01 max.
Pb	0.02 max.

### MECHANICAL PROPERTIES OF WELD METAL

Tensile Strength (psi) ..... 50,000 min.  
Brinell hardness..... 80-100  
Melting point ..... 1866°F

## DEOX COPPER ALLOY NO. 189

AWS A5.7-84 Class ERCu, AWS A5.27-85 RCu  
†ASME SFA5.7, ASME SFA 5.27 ERCu  
†QQ-R-571C, MIL-R-19631-B, TYPE MIL-RCu2

### DESCRIPTION AND APPLICATIONS

DEOX Copper is a 98% copper filler metal used for MIG, TIG and oxyacetylene welding of copper and copper alloyed base metals. DEOX Copper contains small amounts of phosphorus and silicon which act as the deoxidizing agents to promote sound weld joints. DEOX Copper is easy flowing and produces weld deposits that are porosity free, electrically conductive and the color will match that of copper. Excellent for joining copper to mild steel, for overlaying steel and for the fabrication of copper pipes, tanks and copper fittings.

### FILLER METAL CHEMISTRY (%)

Cu	98.0 min.
Sn	1.0 max.
Mn	0.50 max.
Si	0.50 max.
P	0.15 max.
Al	0.01 max.
Pb	0.02 max.

### MECHANICAL PROPERTIES OF WELD METAL

Tensile strength (psi)..... 25,000 min.  
Rockwell F hardness..... 25 avg.  
Melting point ..... 1967°F

## ALUMINUM BRONZE A-1 ALLOY NO. 610

AWS A5.7-84 Class ERCuAl-A1  
†ASME SFA5.7 ERCuAl-A1

### DESCRIPTION AND APPLICATIONS

Aluminum Bronze Al is an iron-free aluminum bronze filler metal used for MIG and TIG overlay welding of bearing and wear resistant surfaces exposed to corrosive environments such as salt or brackish water and commonly used acids. Aluminum Bronze A-1 is not recommended for joining. Commonly used in steel and pulp mills to overlay tube sheets, valve seats and refineries.

### FILLER METAL CHEMISTRY (%)

*Cu	Balance
Zn	0.20 max.
Min	0.50 max.
Si	0.10 max.
Al	6.0-8.5
Pb	0.02 max.

\*Includes Silver (Ag)

### MECHANICAL PROPERTIES OF WELD METAL

Tensile strength (psi)... 55,000 min.  
Brinell hardness..... 80-110

## ALUMINUM BRONZE A-2 ALLOY NO. 618

AWS A5.7 Class ERCuAl-A2  
†ASME SFA5.7 ERCuAl-A2  
†QQ-R-571C MIL-R-19631B TYPE MIL-RcuAl-A2

### DESCRIPTION AND APPLICATIONS

Aluminum Bronze A-2 is an iron-bearing MIG and TIG filler metal used for joining aluminum bronze of similar composition, silicon and manganese bronze, high strength copper-zinc alloys, some copper nickel alloys, ferrous metals and dissimilar metals. Dissimilar metal combinations would include aluminum bronze to steel and copper to steel. Aluminum Bronze A-2 is excellent for building-up or overlaying metal for wear and corrosion resistant surfaces. Weld deposits exhibit high mechanical properties, tensile strength, yield strength and hardness. Most common applications would include marine maintenance and repair welding of ship propellers; pump housings, rigging jacks, piston heads, bearings and many overlay or surfacing applications.

### FILLER METAL CHEMISTRY (%)

Cu	Balance
Al	8.5-11.0
Fe	1.5 max.
Zn	0.02 max.
Si	0.10 max.
Pb	0.02 max.

## APPROXIMATE GMAW (MIG) CONDITIONS FOR SPRAY TRANSFER WITH COPPER AND COPPER ALLOY WIRES

Type	Diam. (Inches)	Minimum Welding Current, A	Volts	lpm
Deoxidized Copper	0.035	180	26	345
	0.045	210	26	250
	0.062	310	26	150
Aluminum Bronze A2	0.035	160	25	295
	0.045	210	25	260
	0.062	280	26	185
Silicon Bronze	0.035	165	24	420
	0.045	205	26 - 27	295
	0.062	270	27 - 28	190

## ARGON SHIELDING

Note: Lead is added in varying percentages to many of the copper alloys for free-machining characteristics. When lead is present in any appreciable quantity, inert gas procedures may either be limited or should be excluded from consideration (depending on the lead content).

t Nickel Based and Cobalt-Based Alloys can be certified to most commercial and aircraft specifications, however material supplied to both ASME and MIL specifications are considered nonstandard and must be tested to the applicable specification. Such testing will necessitate additional charges to the buyer. It is the responsibility of the buyer to state these ASME or MIL specification requirements at the time of inquiry.