

Silicon Bronze

C651

Alloy C651 is a corrosion resistant copper alloy. It is primarily used as a welding rod and for mechanical fasteners and electrical connections.

Mechanical Properties

ROUND & SQUARE WIRE...as drawn	
Temper	Tensile Strength PSI
Annealed	38-55,000
1/4 Hard	60-75,000
1/2 Hard	75-95,000
Hard	90-110,000
Spring	100,000 Min.
ROLLED FLAT WIRE...wire other than square	
Temper	Tensile Strength PSI
Annealed	40-50,000
1/4 Hard	42-52,000
1/2 Hard	47-57,000
Hard	60-70,000
Extra Hard	67-76,000
Spring	71-79,000

Note: Flat wire sections having a 3:1 width to thickness ratio or less are by commercial convention processed to the same tensile strength values as round or square wire.

Physical Properties

Physical Properties	English Units	Metric Units
Melting Point (Liquidus)	1940°F	1060°C
Melting Point (Solidus)	1890°F	1030°C
Density	.316 lb/cu in @ 68°F	8.75 gm/cu cm
Thermal Conductivity (Annealed)	33 Btu ft/sq ft hr °F @ 68°F	.14 cal cm/sq cm sec °C @ 20°C
Coefficient of Thermal Expansion	.0000099 per °F (68-572°F)	.0000179 per °C (20-300°C)
Electrical Resistivity (Annealed)	86.4 ohms (cir mil/ft) @ 68°F	14.4 microhm/cm @ 20°C
Electrical Conductivity (Annealed)	12% IACS*	.0696 megmho/cm @ 20°C
Modulus of Elasticity	17,000,000 psi	12,000 kg/sq mm

*International Annealed Copper Standard

Conversion Factors Metric Tensile Strengths

$$\text{kg/mm}^2 = \text{KSI} \times .7031$$

$$\text{Newtons/mm}^2 = \text{KSI} \times 6.895$$

or
MPa



Chemical Composition

Nominal Composition	
Copper	98.5%
Silicon	1.5%
Composition Limits	
Copper	Remainder
Silicon	0.8 - 2%
Magnanese	0.7% Max.
Zinc	1.5% Max.
Iron	0.8% Max.
Lead	0.05% Max.

Specifications

ASTM B96
ASTM B99
ASTM B250

Mill Limits

Round	.0010 - .1285 inch .0254 - 3.264 mm
Square and Rectangular	.0100 - .0808 inch .2540 - 1.905 mm Corner Radius as Specified
Flat	Thickness: .0100 - .0500 inch .2540 - 1.270 mm Width: .0150 - .2500 inch .3810 - 6.350 mm Edge Condition as Specified
Shapes	Special Shapes and Sizes Produced to Order