

# Beryllium Copper

# C172

Beryllium Copper alloys combine formability with very high strength properties when aged. Applications are in springs, connectors, switches and automotive parts. Special heat treating of the wire at the mill produces a “Mill Hardened” (HM) tempered Beryllium Copper wire which can then be formed and used without additional heat treatment.

## Mechanical Properties

ROUND & SQUARE WIRE...as drawn				
Temper Names (Solutionized) » (Aged)	Tensile Strength (ksi)		Yield Strength (0.2% Offset)(ksi)	
	Solutionized	After Aging	Solutionized	After Aging
Annealed (A) → (AT)	58-78	160-200	20-35	145-180
1/4 Hard (1/4H) → (1/4HT)	90-115	175-210	70-105	165-200
1/2 Hard (1/2H) → (1/2HT)	110-135	185-215	90-125	170-200
3/4 Hard (3/4H) → (3/4HT)	130-155	190-230	110-150	175-220
Hard (H) → (HT)	140-165	195-230	130-160	180-220
Extra Hard (6H) → (6HT)	155-180	205-235	150-175	190-220

  

ROLLED FLAT WIRE...as rolled				
Temper Names (Solutionized) » (Aged)	Tensile Strength (ksi)		Yield Strength (0.2% Offset)(ksi)	
	Solutionized	After Aging	Solutionized	After Aging
Annealed (A) → (AT)	60-78	165-195	30-55	140-175
1/4 Hard (1/4H) → (1/4HT)	75-88	175-205	60-80	150-185
1/2 Hard (1/2H) → (1/2HT)	85-100	185-215	75-95	160-195
Hard (H) → (HT)	100-120	190-220	95-115	165-205

Conductivity Solutionized = 15-17% IACS    Conductivity Aged = 22% IACS

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 Range	1590-1800°F	866-982°C
Solutionizing Temperature	1450°F	788°C
Density	.298 lbs/cu in	8.26 gm/cu cm
Thermal Conductivity (Solutionized - Aged)	62-75 Btu ft/sq ft hr °F @ 68°F	.26-32 cal cm/sq cm sec°C @ 20°C
Coefficient of Thermal Expansion	.0000094°F (68-572°F)	.0000169°C (20-300°C)
Electrical Resistivity (Solutionized) (Age Hardened)	69.1-57.6 Ω(cir mil/ft)@68°F 47.1-38.4 Ω(cir mil/ft)@68°F	11.4-9.6 μΩ-cm @ 20°C 7.8-6.4 μΩ-cm @ 20°C
Electrical Conductivity (Solutionized) (Age Hardened)	15-18% IACS* @ 68°F 22-27% IACS* @ 68°F	.087-.104 megmho/cm @ 20°C .128-.157 megmho/cm @ 20°C
Modulus of Elasticity	17,5 - 18,500,000 psi	12,000 -13,000 kg/sq mm

\*International Annealed Copper Standard



## Chemical Composition

Copper	97.5%
Beryllium	1.8 - 2.0%
Cobalt+Nickel	0.2% Min
Co+Ni+Fe	0.6% Max.
Copper+Named	99.5%

## Specifications

ASTM B194  
ASTM B197  
ASTM B250  
AMS 4725  
QQ-C-530  
QQ-C-533

## Age Hardening Time at 600 °F

Condition	Round and Square	Flat
AT	3	3
1/4 HT	2	2
1/2 HT	1.5	2
3/4 HT	1	2
HT	1	2
5HT	1	
6HT	1	

## Conversion Factors Metric Tensile Strengths

kg/mm<sup>2</sup> = KSI x .7031

Newtons/mm<sup>2</sup> = KSI x 6.895  
or  
MPa

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