

COPPER ALLOY No. C38500 (ARCHITECTURAL BRONZE)

Composition — percent

	Nominal	Minimum	Maximum
Copper	57	55.0	59.0
Lead	3	2.5	3.5
Iron	...	...	...35
Zinc	40	Remainder	

Nearest Applicable A S T M Specifications

Flat Products	B455
Pipe	
Rod	
Shapes	
Tube	
Wire	

Physical Properties

	English Units	C. G. S. Units
Melting Point (Liquidus)	1630 F	890 C
Melting Point (Solidus)	1610 F	875 C
Density	.306 lb/cu in @ 68 F	8.47 gm/cu cm @ 20 C.
Specific Gravity	8.47	8.47
Coefficient of Thermal Expansion	per °F from 68 F to 212 F	per °C from 20 C to 100 C
Coefficient of Thermal Expansion	per °F from 68 F to 392 F	per °C from 20 C to 200 C
Coefficient of Thermal Expansion	.0000116 per °F from 68 F to 572 F	.0000209 per °C from 20 C to 300 C
Thermal Conductivity	71 Btu/sq ft/hr/°F @ 68 F	.29 cal/sq cm/cm/sec/°C @ 20 C
Electrical Resistivity (Annealed)	37.0 Ohms (circ mil/ft) @ 68 F	6.16 Micromho-cm @ 20 C
Electrical Conductivity* (Annealed)	28 % IACS @ 68 F	.162 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	.09 Btu/lb °F @ 68 F	.09 cal/gm °C @ 20 C
Modulus of Elasticity (Tension)	14,000 ksi	9,800 Kg/sq mm
Modulus of Rigidity	5,300 ksi	3,700 Kg/sq mm

*Volume Basis

Typical Uses

ARCHITECTURAL:	architectural extrusions, store fronts, thresholds, trim
HARDWARE:	butts, hinges, lock bodies
INDUSTRIAL:	forgings

Common Fabrication Processes

Hot forging and pressing, hot forming and bending, machining

Fabrication Properties

Capacity for Being Cold Worked	... Poor
Capacity for Being Hot Formed	... Excellent
Hot Forgeability Rating (Forging Brass = 100)	...
Hot Working Temperature	... 1150-1350 F or 625-725 C
Annealing Temperature	... 800-1100 F or 425-600 C
Machinability Rating (Free Cutting Brass = 100)	... 90

Suitability for being joined by:	
Soldering	... Excellent
Brazing	... Good
Oxyacetylene Welding	... Not Recommended
Gas Shielded Arc Welding	... Not Recommended
Coated Metal Arc Welding	... Not Recommended
Resistance Welding	
Spot	... Not Recommended
Seam	... Not Recommended
Butt	... Fair

Forms and Tempers Most Commonly Used

Forms and Tempers Most Commonly Used	Annealed Tempers					Rolled or Drawn Tempers					Hot Finished Tempers										
	Nominal Grain Size mm																				
	.100 (CS100)	.070 (CS070)	.050 (CS050)	.035 (CS035)	.025 (CS025)	.015 (CS015)	Soft Anneal (CS60)	Light Anneal (CS60)	Half Hard (H02)	Three Quarter Hard (H03)	Hard (H04)	Extra Hard (H06)	Spring (H08)	Extra Spring (H10)	Drawn — General Purpose (H58)	Hard Drawn (H80)	Light Drawn — Bending (H55)	As Hot Rolled (M20)	As Extruded (M30)	Special Tempers	
FLAT PRODUCTS
Strip, Rolled
Strip, Drawn
Flat Wire, Rolled
Flat Wire, Drawn
Bar, Rolled
Bar, Drawn
Sheet
ROD
WIRE
TUBE
PIPE
SHAPES

DRAWN—GENERAL PURPOSE (H58) temper is used for general purpose tube only, usually where there is no real requirement for high strength or hardness on the one hand or for bending qualities on the other.

HARD DRAWN (H80) temper is used only where there is need for a tube as hard or as strong as is commercially feasible for the size in question.

LIGHT DRAWN—BENDING (H55) temper is used only where a tube of some stiffness, but yet capable of readily being bent (or otherwise moderately cold worked) is needed.

Mechanical Properties

Form	Size Section in.	Temper	Tensile Strength ksi	Yield Strength		Elongation in 2 in. %	Rockwell Hardness		Shear Strength ksi	Fatigue Strength	
				(.5% Ext. under Load) ksi	(.2% Offset) ksi		F	B 30T		ksi	Million Cycles
SHAPES	1.0 in.	As Extruded	60.0	20.0	.....	30	65	35.0	.....	.....	.....

The values listed above represent reasonable approximations suitable for general engineering use. Due to commercial variations in composition and to manufacturing limitations, they should not be used for specification purposes. See applicable A.S.T.M. specification references.