

COPPER ALLOY No. C33500 (LOW LEADED BRASS)

Composition — percent

	Nominal	Minimum	Maximum
Copper	63.5	62.0	65.0
Lead	.5	.25	.7
Iron	.....	.....	.10
Zinc	36	Rem.	

Nearest Applicable A S T M Specifications

Flat Products	B121
Pipe	
Rod	B453
Shapes	
Tube	
Wire	

Physical Properties

	English Units	C. G. S. Units
Melting Point (Liquidus)	1700 F	925 C
Melting Point (Solidus)	1650 F	900 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	.0000113 per °F from 68 F to 572 F	.0000203 per °C from 20 C to 300 C
Thermal Conductivity	67 Btu /sq ft /ft /hr /°F @ 68 F	.28 cal /sq cm /cm /sec /°C @ 20 C
Electrical Resistivity (Annealed)	39.9 Ohms (circ mil /ft) @ 68 F	6.63 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	26 % IACS @ 68 F	.151 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	.09 Btu /lb °F @ 68 F	.09 cal /gm °C @ 20 C
Modulus of Elasticity (Tension)	15,000 ksi	10,500 Kg /sq mm
Modulus of Rigidity	5,600 ksi	3,900 Kg /sq mm

* Volume Basis

Typical Uses

HARDWARE: butts, hinge brass, watch backs

Common Fabrication Processes

Blanking, drawing, machining, piercing and punching, stamping

Fabrication Properties

Capacity for Being Cold Worked	Good
Capacity for Being Hot Formed	Poor
Hot Forgeability Rating (Forging Brass = 100)	.....
Hot Working Temperature	..... F or C
Annealing Temperature	800-1300 F or 425-700 C
Machinability Rating (Free Cutting Brass = 100)	60

Suitability for being joined by:	
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Not Recommended
Resistance Welding	
Spot	Fair
Seam	Not Recommended
Bullt	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		Soft Anneal (O60)	Light Anneal (O50)	Eighth Hard (H00)	Quarter Hard (H01)	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	Plate	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	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 (ksi)		Elongation in 2 in. %	Rockwell Hardness		Shear Strength ksi	Fatigue Strength	
				(.5% Ext. under Load)	(.2% Offset)		F	B 30T		ksi	Million Cycles
FLAT PRODUCTS	.040 in.	.070 mm	46.0	14.0	.....	65	58 - 15	32.0	.....	.....	.....
		.050 mm	47.0	15.0	.....	62	64 - 26	.....	.....	.....	.....
		.035 mm	49.0	17.0	.....	57	68 - 31	34.0	.....	.....	.....
		.025 mm	51.0	19.0	.....	55	72 - 36	.....	.....	.....	.....
		Quarter Hard	54.0	40.0	.....	43	55 54	36.0	.....	.....	.....
		Half Hard	61.0	50.0	.....	23	70 65	40.0	.....	.....	.....
		Hard	74.0	60.0	.....	8	80 69	43.0	.....	.....	.....

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.