

# COPPER ALLOY No. C314000 (LEADED COMMERCIAL BRONZE)

**Composition – percent**

	Nominal	Minimum	Maximum
Copper	89	87.5	90.5
Lead	1.9	1.3	2.5
Iron	.....	.....	.10
Zinc	9.1	Remainder	
Nickel	.....	.....	.7

**Nearest Applicable A S T M Specifications**

Flat Products	B140
Pipe	
Rod	B140
Shapes	B140
Tube	
Wire	

**Forms and Tempers Most Commonly Used**

	Annealed Tempers					Rolled or Drawn Tempers							Hot Finished Tempers												
	Nominal Grain Size mm																								
	.100 (C5100)	.070 (C5070)	.050 (C5050)	.035 (C5035)	.025 (C5025)	.015 (C5015)	Soft Anneal (C50)	Light Anneal (C50)	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																									

**Physical Properties**

	English Units	C. G. S. Units
Melting Point (Liquidus)	1900 F	1040 C
Melting Point (Solidus)	1850 F	1010 C
Density	.319 lb/cu in @ 68 F	8.83 gm/cu cm @ 20 C.
Specific Gravity	8.83	8.83
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 300 C
Coefficient of Thermal Expansion	.0000102 per °F from 68 F to 572 F	.0000184 per °C from 20 C to 300 C
Thermal Conductivity	104 Btu/sq ft /ft /hr /°F @ 68 F	.43 cal /sq cm /cm /sec /°C @ 20 C
Electrical Resistivity (Annealed)	24.7 Ohms (circ mil /ft) @ 68 F	4.10 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	42 % IACS @ 68 F	.244 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	.09 Btu /lb °F @ 68 F	.09 cal /gm °C @ 20 C
Modulus of Elasticity (Tension)	17,000 ksi	12,000 Kg /sq mm
Modulus of Rigidity	6,400 ksi	4,500 Kg /sq mm

\* Volume Basis

**Typical Uses**

**HARDWARE:** screws, screw machine parts  
**INDUSTRIAL:** pickling crates

**Common Fabrication Processes**

**Machining**

**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 ..... 800-1200 F or 425-650 C  
 Machinability Rating (Free Cutting Brass = 100) ..... 80

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

**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
DRAWN BAR	.250 in.	Half Hard	55.0	50.0	.....	12	-- 61 --	31.0	.....	.....	.....
	ROD	1.0 in.	.050 mm	37.0	12.0	.....	45	55 -- --	24.0	.....	.....
ROD	.250 in.	Half Hard (37%)	60.0	55.0	.....	10	-- 65 --	32.0	.....	.....	.....
	.500 in.	Half Hard (25%)	55.0	50.0	.....	14	-- 61 --	31.0	.....	.....	.....
	1.0 in.	Half Hard (20%)	52.0	45.0	.....	18	-- 58 --	30.0	.....	.....	.....

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.