

COPPER ALLOY No. C23000 (RED BRASS, 85%)

Composition — percent

	Nominal	Minimum	Maximum
Copper	85	84.0	86.0
Lead	.....	.....	.05
Iron	.....	.....	.05
Zinc	15	Remainder	

Nearest Applicable A S T M Specifications

Flat Products	B36, B134
Fittings	ANSI B16.22, ANSI B16.29
Nipples	B687
Pipe	B43
Rod	
Shapes	
Tube	B111, B135, B359, B395, B543
Wire	B134

Physical Properties

	English Units	C. G. S. Units
Melting Point (Liquidus)	1880 F	1025 C
Melting Point (Solidus)	1810 F	990 C
Density	.316 lb /cu in @ 68 F	8.75 gm /cu cm @ 20 C.
Specific Gravity	8.75	8.75
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	.0000104 per °F from 68 F to 572 F	.0000187 per °C from 20 C to 300 C
Thermal Conductivity	92 Btu /sq ft /ft /hr °F @ 68 F	.38 cal /sq cm /cm /sec °C @ 20 C
Electrical Resistivity (Annealed)	28.0 Ohms (circ mil /ft) @ 68 F	4.66 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	37 % IACS @ 68 F	.215 Meghm-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

ARCHITECTURAL:	etching parts, trim, weatherstrip
ELECTRICAL:	conduit, screw shells, sockets
HARDWARE:	eyelets, fasteners, fire extinguishers
INDUSTRIAL:	condenser and heat exchanger tubes, flexible hose, pickling crates, plumbing pipe, pump lines, radiator cores
PLUMBING:	J-bends, pipe service lines, traps
MISCELLANEOUS:	badges, compacts, costume jewelry, dials, etched articles, lipstick containers, nameplates, rouge boxes, tags

Common Fabrication Processes

Blanking, coining, drawing, etching, forming and bending, heading and upsetting, piercing and punching, roll threading and knurling, shearing, spinning, squeezing and swaging, stamping

Fabrication Properties

Capacity for Being Cold Worked.....	Excellent
Capacity for Being Hot Formed.....	Good
Hot Forgeability Rating (Forging Brass = 100).....	.....
Hot Working Temperature.....	1450-1650 F or 800-900 C
Annealing Temperature.....	800-1350 F or 425-725 C
Machinability Rating (Free Cutting Brass = 100).....	30

Suitability for being joined by:

Soldering.....	Excellent
Brazing.....	Excellent
Oxyacetylene Welding.....	Good
Gas Shielded Arc Welding.....	Good
Coated Metal Arc Welding.....	Not Recommended
Resistance Welding { Spot.....	Fair
{ Seam.....	Not Recommended
{ Butt.....	Good

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															
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	Temper	Yield Strength			Elongation in 2 in.	Rockwell Hardness	Shear Strength	Fatigue Strength	
			Tensile Strength	(.5% Ext. under Load)	(.2% Offset)				ksi	Million Cycles
FLAT PRODUCTS	.040 in.	.070 mm	39.0	10.0	.....	48	56 - 10	31.0	.....	.....
		.050 mm	40.0	12.0	.....	47	59 - 14	31.0	.....	.....
		.035 mm	41.0	14.0	.....	46	63 - 22	31.0	.....	.....
		.025 mm	43.0	16.0	.....	44	66 - 28	32.0	.....	.....
		.015 mm	45.0	18.0	.....	42	71 - 38	33.0	.....	.....
		Quarter Hard	50.0	39.0	.....	25	55 54	35.0	.....	.....
		Half Hard	57.0	49.0	.....	12	65 60	37.0	.....	.....
		Hard	70.0	57.0	.....	5	77 68	42.0	.....	.....
		Extra Hard	78.0	61.0	.....	4	83 72	44.0	.....	.....
		Spring	84.0	63.0	.....	3	86 74	46.0	.....	.....
WIRE	.080 in.	.035 mm	41.0	.....	.....	48	.....	31.0	.....	.....
		.025 mm	43.0	.....	.....	.....	.....	32.0	.....	.....
		.015 mm	45.0	.....	.....	.....	.....	33.0	.....	.....
		Eighth Hard	50.0	.....	.....	25	.....	35.0	20.0*	100
		Quarter Hard	59.0	.....	.....	11	.....	38.0	.....	.....
		Half Hard	72.0	.....	.....	8	.....	43.0	.....	.....
TUBE	1.0 in. OD X .065 in.	.050 mm	40.0	12.0	.....	55	60 - 15	.....	.....	.....
		.015 mm	44.0	18.0	.....	45	71 - 38	.....	.....	.....
		Light Drawn (15%)	50.0	40.0	.....	30	55 54	.....	.....	.....
		Hard Drawn (35%)	70.0	58.0	.....	8	77 68	.....	.....	.....
PIPE	3/4 in. SPS	.015 mm	44.0	18.0	.....	45	71 - -	.....	.....	.....

* Rotating beam tests on red.

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.