

Composition—Percent

	Nominal	Minimum	Maximum
Copper	69.5	—	—
Lead	—	—	.05
Iron	.5	.40	.7
Zinc	—	—	1.0
Nickel	30	29.0	33.0
Manganese	—	—	1.0
Copper + Elements with Specific Limits	—	99.5	—

Nearest Applicable ASTM Specifications	
Flat Products	B122, B151, B171, B402, B432
Pipe	B466, B467
Rod	B151
Shapes	
Tube	B111, B359, B395, B466, B467, B543, B552
Wire	

Physical Properties

	English Units	C.G.S. Units
Melting Point (Liquidus)	2260°F.	1240°C.
Melting Point (Solidus)	2140°F.	1170°C.
Density	.323 lb./cu. in. @ 68°F.	.894 gm./cu. cm. @ 20°C.
Specific Gravity	8.94	8.94
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	.0000090 per °F. from 68°F. to 572°F.	.0000162 per °C. from 20°C. to 300°C.
Thermal Conductivity	17 Btu./sq. ft./ft./hr./°F. @ 68°F.	.07 cal./sq. cm./cm./sec./°C. @ 20°C.
Electrical Resistivity (Annealed)	225 Ohms (circ. mil./ft.) @ 68°F.	37.5 Microhm-cm. @ 20°C.
Electrical Conductivity* (Annealed)	4.6% IACS @ 68°F.	.0267 Megohm-cm. @ 20°C.
Thermal Capacity (Specific Heat)	.09 Btu./lb./°F. @ 68°F.	.09 cal./gm./°C. @ 20°C.
Modulus of Elasticity (Tension)	22,000,000 psi	15,500 Kg./sq. mm.
Modulus of Rigidity	8,300,000 psi	5,800 Kg./sq. mm.

*Volume basis

Typical Uses

INDUSTRIAL: Condensers, condenser plates, distiller tubes, evaporator and heat exchanger tubes, ferrules, salt water piping

Common Fabrication Processes

Forming and bending, welding

Fabrication Properties

Capacity for being Cold Worked Good
 Capacity for being Hot Formed Good
 Hot Forgeability Rating (Forging Brass = 100) —
 Hot Working Temperature 1700-1900°F. or 925-1050°C.
 Annealing Temperature 1200-1500°F. or 650-825°C.
 Machinability Rating (Free Cutting Brass = 100) 20

Suitability for being joined by:

Soldering Excellent
 Brazing Excellent
 Oxyacetylene Welding Good
 Gas Shielded Arc Welding Excellent
 Coated Metal Arc Welding Excellent
 Resistance Welding { Spot Excellent
 Seam Excellent
 Butt Excellent

Mechanical Properties

Form	Size Section in.	Temper	Tensile Strength ksi	Yield Strength		Elongation in 2" %	Rockwell Hardness			Shear Strength ksi	Fatigue Strength	
				(.5% Ext. Under Load) ksi	(.2% Offset) ksi		F	B	30T		ksi	Million Cycles
FLAT PRODUCTS TUBE	1.0 in.	As Hot Rolled	55.0	20.0	—	45	—	35	—	—	—	—
	1.0 in. OD x .065 in.	.025 mm.	60.0	25.0	—	45	80	45	—	—	—	—
	4.5 in. OD x .109 in.	.035 mm.	54.0	—	—	45	77	36	—	—	—	—
ROD	1.0 in.	Half Hard (20%)	75.0	70.0	—	15	—	80	—	—	—	—

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.