

COPPER ALLOY No. C75200 (NICKEL SILVER, 65-18)

Composition — percent

	Nominal	Minimum	Maximum
Copper	65	63.0	66.5
Lead05
Iron25
Zinc	17	Remainder	
Nickel	18	16.5	19.5
Manganese50

Nearest Applicable A S T M Specifications

Flat Products	B122, B151, B206
Pipe	
Rod	B151
Shapes	
Tube	
Wire	B206

Physical Properties

	English Units	C. G. S. Units
Melting Point (Liquidus)	2030 F	1110 C
Melting Point (Solidus)	1960 F	1070 C
Density	.316 lb /cu in @ 68 F	8.73 gm /cu cm @ 20 C.
Specific Gravity	8.73	8.73
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	19 Btu /sq ft /ft /hr /°F @ 68 F	.08 cal /sq cm /cm /sec °C @ 20 C
Electrical Resistivity (Annealed)	173 Ohms (circ mil /ft) @ 68 F	28.7 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	6.0 % IACS @ 68 F	.0348 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	.09 Btu /lb °F @ 68 F	.09 cal /gm °C @ 20 C
Modulus of Elasticity (Tension)	18,000 ksi	12,700 Kg /sq mm
Modulus of Rigidity	6,800 ksi	4,800 Kg /sq mm

* Volume Basis

Typical Uses

HARDWARE: rivets, screws, table flat ware, truss wire, zippers
OPTICAL GOODS: bows, camera parts, core bars, temples
MISCELLANEOUS: base for silver plate, costume jewelry, etching stock, hollow ware, name plates, radio dials

Common Fabrication Processes

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

Fabrication Properties

Capacity for Being Cold Worked Excellent
 Capacity for Being Hot Formed Poor
 Hot Forgeability Rating (Forging Brass = 100)
 Hot Working Temperature F or C
 Annealing Temperature 1100-1400 F or 600-750 C
 Machinability Rating (Free Cutting Brass = 100) 20

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

Forms and Tempers Most Commonly Used

Forms and Tempers Most Commonly Used	Annealed Tempers		Rolled or Drawn Tempers																					
	Nominal Grain Size mm		Nominal Grain Size mm																					
	.100 (O8100)	.070 (O8070)	.060 (O8060)	.050 (O8050)	.045 (O8045)	.040 (O8040)	Soft Anneal (O80)	Light Anneal (O80)	Eight Hard (H80)	Quarter Hard (H81)	Half Hard (H82)	Three Quarter Hard (H83)	Hard (H84)	Extra Hard (H88)	Spring (H98)	Extra Spring (H10)	Drawn — General Purpose (H88)	Hard Drawn (H80)	Light Drawn — Bending (H85)	Hot Finished Tempers				
																					As Hot Rolled (M20)	As Extruded (M30)	Special Tempers	
FLAT PRODUCTS	Strip, Rolled Strip, Drawn Strip, 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		Yield Strength		Elongation in 2 in. %	Rockwell Hardness			Shear Strength		Fatigue Strength		
			(.8% Ext. under Load)	(.2% Offset)	(.8% Ext. under Load)	(.2% Offset)		F	B	30T	ksi	ksi	Million Cycles		
FLAT PRODUCTS	.040 in.	.035 mm	58.0	25.0	—	—	40	85	40	—	—	—	—	—	—
		.015 mm	60.0	30.0	—	—	32	90	55	—	—	—	—	—	—
		Quarter Hard	65.0	50.0	—	—	20	—	73	65	—	—	—	—	—
		Half Hard	74.0	62.0	—	—	8	—	83	72	—	—	—	—	—
		Hard	85.0	74.0	—	—	3	—	87	75	—	—	—	—	—
ROD	.500 in.	.035 mm	56.0	25.0	—	—	42	—	—	—	—	—	—	—	
		Half Hard (20%)	70.0	60.0	—	—	20	—	78	—	—	—	—	—	
WIRE	.080 in.	.035 mm	58.0	25.0	—	—	45	—	—	—	—	—	—	—	
		.015 mm	60.0	30.0	—	—	35	—	—	—	—	—	—	—	
		Quarter Hard	73.0	65.0	—	—	16	—	—	—	—	—	—	—	
		Half Hard	86.0	80.0	—	—	7	—	—	—	—	—	—	—	
		Hard	103.0	90.0	—	—	3	—	—	—	—	—	—	—	

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.