



Material Data Sheet

903

Copper-Tin (Tin Bronze)

Chemical Composition
(% max, unless shown as range or min.)

	Cu*	Sn	Pb	Zn	Fe	Sb	Ni	S	P	Al	Si	Mn
Min/Max	86.0-89.0	7.5-9.0	.30	3.0-5.0	.20	.20	1.0	.05	.05	.005	.005	-
Nominal	87.5	8.3	-	4.0	-	-	-	-	-	-	-	-

*Cu + Sum of Named Elements, 99.4% min.
In determining Cu min., Cu may be calculated as Cu + Ni

Applicable Specifications

Process or Ingot	Specification
Sand	ASTM B 584, B 763 SAE J461, J462

Fabrication Practices

Joining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1832 F	1000 C
Melting Point - Solidus	1570 F	854 C
Density	0.318 lb/in ³ @ 68 F	8.8 gm/cm ³ @ 20 C
Specific Gravity	8.8	8.8
Electrical Resistivity	87.2 ohms-cmil/ft @ 68 F	14.49 microhm-cm @ 20 C
Electrical Conductivity	12 %IACS @ 68 F	0.069 MegaSiemens/cm @ 20 C
Thermal Conductivity	43.2 Btu · ft/(hr · ft ² · °F) at 68F	74.8 W/m · °K at 20 C
Coefficient of Thermal Expansion	10.0 · 10 ⁻⁶ per °F (68-392 F)	18.0 · 10 ⁻⁶ per °C (20-200 C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 F	377.1 J/kg · °K at 293 K
Modulus of Elasticity in Tension	14000 ksi	96500 MPa
Magnetic Permeability	1.0	1.0

Heat Treatment

Stress Relieving:
500° F (260C) for 1h/in. of Section Thickness

Cannot be strengthened by heat treatment

Machinability Rating: 30
(C36000, Free Cutting Brass = 100)

Typical Uses:

Bearings and bushings
Seal Rings
Gears
Piston Rings
Pump Impellers
Steam Fittings
Valve Components

Mechanical Properties

		US Customary	Metric	Applicable Specification
Tensile Strength	Minimum	40 ksi	276 MPa	ASTM B 584, B 763 SAE J462-A
	Minimum	40 ksi	275 MPa	
	Typical	45 ksi	310 MPa	
Yield Strength (0.5% Ext. under load)	Minimum	18 ksi	124 MPa	ASTM B 584, B 763 SAE J462-A
	Minimum	18 ksi	125 MPa	
	Typical	21 ksi	145 MPa	
Elongation	Minimum	20 %, in 2 in.	20 %, in 51 mm	ASTM B 584, B 763, SAE J462-A
	Typical	30 %, in 2 in.	30 %, in 51 mm	
Brinell Hardness (500kg load)	Typical	70	70	

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