

C93200

Product Description:	Leaded Tin Bronze
Solids:	½" to 13" O.D.
Tubes:	1" to 16" O.D.
Rectangles:	Up to 20"
Standard Lengths:	105"
Shape/Form:	semi-finished, mill stock or near-net shapes, anode, bar stock, billet/bloom, squares, hex, plate, profile or structural shape, flats/rectangular bar

Typical Uses

Automotive	automotive fittings
Fasteners	washers
Industrial	bushings, bearings, bearings for cranes, diesel engine wrist pin bushings, forging press toggle lever bearings, insert bearings, fittings, fuel pump bushings, general purpose bushings, hydraulic press main lining, hydraulic press stuffing box, linkage bushings for presses, machine parts, machine tool bearings, main spindle bearings, pump fixtures, pump impellers, pumps, roll neck bearings, rolling mill bearings, thrust washers, trunion bearings, water pump bushings

Similar or Equivalent Specification

CDA	ASTM	SAE	AMS	Federal	Military	Other
C93200	B505 B505M	J461 J462		QQ-C-390, E7 QQ-B-1005, Comp 12	MIL-B-11553, Comp 12	Bearing Bronze

Chemical Composition

Cu% ¹	Pb%	Sn%	Zn%	Fe%	P%	Ni% ^{1,2}	Al%	S%	Sb%	Si%
81.00- 85.00	6.00- 8.00	6.30- 7.50	2.00- 4.00	0.20	1.50	1.00	0.005	0.08	0.35	0.005

Chemical Composition according to ASTM B505/B505M-18

¹In determining Cu min., Cu may be calculated as Cu + Ni. ²Ni value includes Co.
Note: Cu + Sum of Named Elements, 99.0% min. Single values represent maximums.

Machinability

Copper Alloy UNS No.	Machinability Rating	Density (lb/in ³ at 68 °F)
C93200	70	0.322

Mechanical Properties

Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation, in 2 in. or 50 mm min	Brinell Hardness (500 kg load)	Remarks
ksi	MPa	ksi	MPa	%	typical BHN	
35	241	20	138	10	65	

Mechanical Properties according to ASTM B505/B505M-18

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1790 °F	977 °C
Melting Point - Solidus	1570 °F	854 °C
Density	0.322 lb/in ³ at 68 °F	8.91 gm/cm ³ at 20 °C
Specific Gravity	8.91	8.91
Electrical Conductivity	12% IACS at 68 °F	0.07 MegaSiemens/cm at 20 °C
Thermal Conductivity	33.6 Btu/sq ft/ft hr/°F at 68 °F	58.2 W/m at 20 °C
Coefficient of Thermal Expansion 68-392	10 · 10 ⁻⁶ per °F (68-392 °F)	17.3 · 10 ⁻⁶ per °C (20-200 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	3771 J/kg at 20 °C
Modulus of Elasticity in Tension	14500 ksi	100000 MPa

Physical Properties provided by CDA

Fabrication Properties

Technique	Suitability
Soldering	Excellent
Brazing*	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Machinability Rating	70

Fabrication Properties provided by CDA

*Since brazing is performed within the hot-short range, strain must be avoided during brazing and cooling.

Thermal Properties

Treatment	Value*	Time**
Stress Relief	500	
Solution Treatment		0

Thermal Properties provided by CDA

*Temperature is measured in Fahrenheit. **For Stress Relief, Solution Treatment and Annealing - Time is measured in hours/inch of thickness. For Precipitation Heat Treatment - Time is measured in hours.