

# C93500

Continuous Cast

<b>Product Description:</b>	High-Leaded Tin Bronze
<b>Solids:</b>	½" to 13" O.D.
<b>Tubes:</b>	1" to 16" O.D.
<b>Rectangles:</b>	Up to 20"
<b>Standard Lengths:</b>	144"
<b>Shape/Form:</b>	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** backing for babbitt-lined bearings

**Industrial** bearings, corrosion-resistant castings, high-speed/light-load bushings, mild acidic applications, pump impellers

## Similar or Equivalent Specification

CDA	ASTM	SAE	AMS	Federal	Military	Other
C93500	B505 B505M B144-3C	66 J461 J462		QQ-C-390, E9 QQ-B-1005, Comp 14	MIL-B-11553, Comp 14	

## Chemical Composition

Cu% <sup>1</sup>	Pb%	Sn%	Zn%	Fe%	P%	Ni% <sup>1,2</sup>	Al%	S%	Sb%	Si%
83.00- 86.00	8.00- 10.00	4.30- 6.00	2.00	0.20	1.50	1.00	0.005	0.08	0.30	0.005

Chemical Composition according to ASTM B505/B505M-18

<sup>1</sup>In determining Cu min., Cu may be calculated as Cu + Ni. <sup>2</sup>Ni 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 <sup>3</sup> at 68 °F)
C93500	70	0.32

## 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	
30	207	16	110	12	60	

Mechanical Properties according to ASTM B505/B505M-18

## Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1830 °F	999 °C
Melting Point – Solidus	1570 °F	854 °C
Density	0.32 lb/in <sup>3</sup> at 68 °F	8.86 gm/cm <sup>3</sup> at 20 °C
Specific Gravity	8.86	8.86
Electrical Conductivity	15% IACS at 68 °F	0.088 MegaSiemens/cm at 20 °C
Thermal Conductivity	40.7 Btu/sq ft/ft hr/°F at 68 °F	70.4 W/m at 20 °C
Coefficient of Thermal Expansion 68-392	9.9 · 10 <sup>-6</sup> per °F (68-392 °F)	17.1 · 10 <sup>-6</sup> per °C (20-200 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 20 °C
Modulus of Elasticity in Tension	14500 ksi	100000 MPa
Incipient Melting	600 °F	316 °C
Magnetic Permeability	1	1

Physical Properties provided by CDA

## Fabrication Properties

Technique	Suitability
Soldering	Good
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.