

# C93200

**Cast**

<b>Product Description:</b>	Leaded Tin Bronze
<b>Solids:</b>	½" to 13" OD
<b>Tubes:</b>	1" to 16" OD
<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** automotive fittings

**Fasteners** washers

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

## Similar or Equivalent Specification

CDA	ASTM	ASARCON	SAE	AMS	FEDERAL	MILITARY	OTHER
C93200	B505 B505M B144-3B	77	660 J461 J462		QQ-C-390, E7 QQ-B-1005, COMP 12	MIL-B-11553, COMP 12	Bearing Bronze

## Chemical Composition

Cu% <sup>1</sup>	Pb%	Sn%	Zn%	Fe%	P% <sup>2</sup>	Ni% <sup>3</sup>	Al%	S%	Sb%	Si%
81.00- 85.00	6.00- 8.00	6.30- 7.50	1.00- 4.00	0.20	0.15	1.00	0.005	0.08	0.35	0.005

Chemical Composition according to ASTM B505/B505M-14

<sup>1</sup>In determining Cu min., Cu may be calculated as Cu + Ni.

<sup>2</sup>For continuous castings, P shall be 1.5% max.

<sup>3</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/cu in at 68° F)
C93200	70	0.322



## Mechanical Properties

C93200 continued

Tensile Strength, min		Yield Strength, at .5% extension under load min		Elongation, in 2 in. or 50 mm min	Brinell Hardness	Remarks
ksi	MPa	ksi	MPa	%	typical BHN	
35	241	20	138	10	65 (500 kg)	

Mechanical Properties according to ASTM B505/B505M-14

## Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1790° F	977° C
Melting Point – Solidus	1570° F	854° C
Density	0.322 lb/in <sup>3</sup> at 68° F	8.91 gm/cm <sup>3</sup> 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 · ft/(hr · ft <sup>2</sup> · °F) at 68° F	58.2 W/m at 20° C
Coefficient of Thermal Expansion	10 · 10 <sup>-6</sup> per °F (68°-212° F)	17.3 · 10 <sup>-6</sup> per °C (20°-100° C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68° F	377.1 J/kg at 293° C
Modulus of Elasticity in Tension	14500 ksi	100000 MPa

Physical Properties provided by CDA

## Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended

Fabrication Properties provided by CDA

## Thermal Properties

Treatment	Temp./Time - US	Temp./Time - SI
Stress Temperature	500	260
Solution Minimum		
Solution Maximum		
Solution Time	0.0	
Solution Medium		
Precipitation Value		
Precipitation Time		
Precipitation Medium		
Annealing Minimum		
Annealing Maximum		
Annealing Time		
Hot Treatment Minimum		
Hot Treatment Maximum		

Thermal Properties provided by CDA

