

# C93200

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## Material

**Notes:** Casting methods recommended for this alloy: Centrifugal, Continuous, Permanent Mold, and Sand.

**Applications:** General-utility bearings and bushings, automobile fittings.

Classified under: High-leaded tin bronzes. ASTM B584; formerly ASTM B144-3B

Typical data for sand-cast test bars. Alloy does not respond to heat treating

**Key Words:** High lead tin bronze, ASTM B584, ASTM B144-3B, SAE 660

Physical Properties	Metric	English	Comments
Density	8.93 g/cc	0.323 lb/in <sup>3</sup>	
Mechanical Properties	Metric	English	Comments
Hardness, Brinell	65	65	
Tensile Strength, Ultimate	240 MPa	34800 psi	
Tensile Strength, Yield	125 MPa @Strain 0.500 %	18100 psi @Strain 0.500 %	
Elongation at Break	20 %	20 %	in 50 mm
Modulus of Elasticity	100 GPa	14500 ksi	
Compressive Strength	315 MPa	45700 psi	at permanent set of 10%
Fatigue Strength	110 MPa @# of Cycles 1.00e+8	16000 psi @# of Cycles 1.00e+8	rotating beam
Machinability	70 %	70 %	UNS C36000 (free-cutting brass) = 100%
Izod Impact	8.00 J	5.90 ft-lb	
Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000143675 ohm-cm @Temperature 20.0 °C	0.0000143675 ohm-cm @Temperature 68.0 °F	
Thermal Properties	Metric	English	Comments
CTE, linear	18.0 µm/m-°C @Temperature 0.000 - 100 °C	10.0 µin/in-°F @Temperature 32.0 - 212 °F	
Thermal Conductivity	59.0 W/m-K @Temperature 20.0 °C	409 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 68.0 °F	

Melting Point	855 - 975 °C	1570 - 1790 °F
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Solidus	855 °C	1570 °F
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Liquidus	975 °C	1790 °F
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<b>Processing Properties</b>	<b>Metric</b>	<b>English</b>	<b>Comments</b>
Melt Temperature	315 °C	599 °F	Incipient
Annealing Temperature	260 °C	500 °F	Stress-Relieving Temperature

<b>Component Elements Properties</b>	<b>Metric</b>	<b>English</b>	<b>Comments</b>
Antimony, Sb	<= 0.35 %	<= 0.35 %	
Copper, Cu	81 - 85 %	81 - 85 %	
Iron, Fe	<= 0.20 %	<= 0.20 %	
Lead, Pb	6.0 - 8.0 %	6.0 - 8.0 %	
Nickel, Ni	<= 0.50 %	<= 0.50 %	
Phosphorous, P	<= 0.15 %	<= 0.15 %	
Silicon, Si	<= 0.0030 %	<= 0.0030 %	
Sulfur, S	<= 0.080 %	<= 0.080 %	
Tin, Sn	6.3 - 7.5 %	6.3 - 7.5 %	
Zinc, Zn	2.0 - 4.0 %	2.0 - 4.0 %	