LEADED TIN BRONZE C93200

CDA NUMBER	C93200	
Common Name	SAE 660	
COMPOSITION PERCENT	**Min**	**Max**
Copper (Cu)	81	85
Tin (Sn)	6.3	7.5
Lead (Pb)	6	8
Zinc (Zn)	1	4
Iron (Fe)		0.2
Antimony (SB)		0.35
Nickel (Ni)		1
Sulphur (S)		0.08
Phosphorous (P)		0.15
Aluminum (Al)		0.005
Silicon (Si)		0.005
Cu + Sum of Named Elements, 99.0% min.		
In determining Cu min., Cu may be calculated as Cu + Ni.		
Ni value includes Co.		
For continuous castings, P shall be 1.5%, max.		
NEAREST APPLICABLE CASTING STANDARDS		
ASTM (B Series)	B584	
SAE (J Series)	461, 462 (was 660)	
Federal (QQ-C- Series)	390	
Military (Mil-C- Series)		
TYPICAL PROPERTIES	**Typ**	**Min**
Tensile Strength (ksi)	38	30
Yield Strength (.5% extension under load) (ksi)	17	14
Elongation (2 inch gauge length) (%)	20	15
Reduction of Area (%)	20	
Proportional Limit (ksi)	8.5	
Modulus of Elasticity (ksi)	14500	
Hardness (Brinell) (HB @ 500kg)	67	
Machinability (% of free cutting brass)	70	
Fatigue Strength (10^8 cycles) (ksi)	16	
Impact Strength (Charpy) (ft-lb)		
Impact Strength (Izod) (ft-lb)	6	
Shear Strength (ksi)		
Compressive Strength (0.001 in. set/in.) (ksi)		
Compressive Strength (0.010 in. set/in.) (ksi)		
Compressive Strength (0.100 in. set/in.) (ksi)	46	
Creep Strength (0.00001% per hour) (ksi)		
Melting Range (Liquidus-Solidus)(F)	1570-1790	
Coefficient of Thermal Expansion (per F @ 68-400F)	0.000010	
Thermal Conductivity (Btu/sq.ft/ft./hr/F @ 68F)	33.6	
Specific Heat (Btu/lb/F @ 68F)	0.09	
Electrical Conductivity (% IACS @ 68F)	12	
Density (lb/cu.in. @ 68F)	0.322	
Pouring Temperature (Light Castings) (F)	2000-2250	
Pouring Temperature (Heavy Castings) (F)	1900-2050	
Patternmakers Shrinkage (in/ft)	7/32	
Drossing	Low	
Gassing	Medium	
Fluidity	Medium	
Shrinkage	Low	
Casting Yield	High	

Corrosion Resistance: Excellent for hydrocarbons, seawater, food products, and some acids.
Wear Resistance: Very Good
Applications: C93200: General utility bearing and bushings, automobile fittings.

Always use the design principles outlined on page two of this information sheet or at our website.
Consult your foundry early in the design process.
This is a high lead alloy. St Paul Brass and Aluminum does not offer it. We can offer low lead alternatives.

St. Paul
Brass and Aluminum
Foundry
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