Copper-Tin-Lead Alloy (Leaded Tin Bronze) C92700

Chemical Composition

(% max., unless shown as range or min.)

	Cu[1] [2]	Sn	Pb	Zn	Fe	Sb	Ni (incl Co)	S	P[3]	Al	Si	Mn
Min./Max.	86.0-89.0	9.0-11.0	1.0-2.5	.7	.20	.25	1.0	.05	.25	.005	.005	–
Nominal	87.7	10.0	1.8	–	–	–	–	–	–	–	–	–

1. Cu + Sum of Named Elements, 99.3% min.
2. In determining Cu min., Cu may be calculated as Cu + Ni.
3. For continuous castings, P shall be 1.5% max.

Applicable Specifications

Process or Ingot	Specification	
Continuous	ASTM	B 505
	SAE	J461, J462
Ingot	ASTM	B 30
	INGOT	206
Sand	SAE	J461, J462

Fabrication Practices

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

Machinability Rating: 45

(C36000, Free Cutting Brass = 100)

Typical Uses

Bearings and Bushings
Gears
Piston Rings
Pump Impellers
Steam Fittings
Valve Components

Casting Characteristics

Characteristic	Value
Effect of Section Size	Large
Patternmakers Shrinkage	3/16 in./ft
Drossing	Low
Gassing	Medium
Fluidity	Medium
Shrinkage	Low
Casting Yield	Medium

Heat Treatment

Stress Relieving: 500 F (260 C) for 1h/in. of Section Thickness
Cannot be Strengthened by Heat Treatment

Physical Properties

	US Customary	Metric
Melting Range, Liquidus	1800 F	982 C
Solidus	1550 F	843 C
Incipient Melting	600 F	316 C
Density	0.317 lb/in.^{3} at 68 F	8.78 g/cm^3 at 20 C
Specific Gravity	8.78	8.78
Electrical Resistivity	94.0 ohm•cmil/ft at 68 F	15.6 microhm-cm at 20 C
Coefficient of Thermal Expansion	10.0 10^{-6} per°F (68-392 F)	18.0 10^{-6} per°C (20-200 C)
Electrical Conductivity	11 %IACS at 68 F	0.064 Siemens/cm at 20 C
Specific Heat Capacity	0.09 Btu/lb/°F at 68 F	377 J/kg•°K at 20 C
Modulus of Elasticity in Tension	16,000 ksi	110,000 MPa

Mechanical Properties*

M01 - AS SAND CAST		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	35 ksi	240 MPa	SAE J462-A
	Typical	42 ksi	290 MPa	
Yield Strength				
0.5% Ext. under load	Minimum	18 ksi	125 MPa	SAE J462-A
	Typical	21 ksi	145 MPa	
Elongation	Minimum	10 %, in 2 in.	10 %, in 51 mm	SAE J462-A
	Typical	20 %, in 2 in.	20 %, in 51 mm	
Brinell Hardness				
500 kg load	Typical	77	77	

M07 - AS CONTINUOUS CAST		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	38 ksi	262 MPa	ASTM B 505
	Minimum	38 ksi	260 MPa	SAE J462-B
Yield Strength				
0.5% Ext. under load	Minimum	20 ksi	138 MPa	ASTM B 505
	Minimum	20 ksi	140 MPa	SAE J462-B
Elongation	Minimum	8 %, in 2 in.	8 %, in 51 mm	ASTM B 505; SAE J462-B

* For alloys listed under SAE J462, suffix symbols are to distinguish between two or more sets of mechanicals properties, heat treatments, conditions, etc., as applicable. See Society of Automotive Engineers Inc., SAE Handbook, Vol. 1 Materials, 1989, Warrendale, PA 15096.