

Copper-Aluminum-Iron-Nickel Alloy (Aluminum Bronze) C95800

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

	Cu ⁽¹⁾	Pb	Fe	Ni (incl Co)	Al	Mn	Mg	Si	Zn	Sn	Other Named Elements
Min. / Max.	79.0min.	.03	3.5-4.5 ⁽²⁾	4.0-5.0 ⁽²⁾	8.5-9.5	.8-1.5	–	.10	–	–	–
Nominal	81.0	–	4.0	4.5	9.0	1.0	–	–	–	–	–

1. Cu + Sum of Named Elements, 99.5% min.
2. Fe content shall not exceed Ni content.

Applicable Specifications

Process or Ingot	Specification	
Centrifugal	ASTM	B 271
	SAE	J461, J462
Continuous	ASTM	B 505
	SAE	J461, J462
Ingot	ASTM	B 30
	INGOT	415G
Precision	ASTM	B 806
Sand	ASTM	B 148, B 763
	MILITARY	MIL-B-24480
	SAE	J461, J462

Fabrication Practices

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

Machinability Rating: 20
(C36000, Free Cutting Brass = 100)

Typical Uses

Propeller Hub
Blades and Other Parts in Contact with Salt Water

Casting Characteristics

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

Heat Treatment

Stress Relieving: 600 F (315 C) for 1h/in. of Section Thickness
Cannot be Strengthened by Heat Treatment

Physical Properties

	US Customary	Metric
Melting Range, Liquidus	1940 F	1060 C
	Solidus 1910 F	1043 C
Density	0.276 lb/in. ³ at 68 F	7.64 g/cm ³ at 20 C
Specific Gravity	7.64	7.64
Electrical Resistivity	146.7 ohm•cmil/ft at 68 F	24.4 microhm-cm at 20 C
Coefficient of Thermal Expansion	9.0 10 ⁻⁶ per°F (68-572 F)	16.2 10 ⁻⁶ per°C (20-300 C)
Magnetic Permeability (F.S.=16kA/m)	1.05	1.05
Thermal Conductivity	20.8 Btu•ft/(hr•ft ² •°F) at 68	36.0 W/m•K at 20 C
Electrical Conductivity	7 %IACS at 68 F	0.041 Siemens/cm at 20 C
Specific Heat Capacity	0.11 Btu/lb/°F at 68 F	440 J/kg•K at 20 C
Modulus of Elasticity in Tension	16,500 ksi	114,000 MPa
Poisson's Ratio	0.32	0.32

Mechanical Properties*

<i>M01 - AS SAND CAST</i>		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	85 ksi	585 MPa	ASTM B 148, B 763; SAE J462-A
	Typical	95 ksi	655 MPa	
Yield Strength				
0.5% Ext. under load	Minimum	35 ksi	240 MPa	ASTM B 148, B 763; SAE J462-A
	Typical	38 ksi	262 MPa	
Elongation	Minimum	15 %, in 2 in.	15 %, in 51 mm	ASTM B 148, B 763; SAE J462-A
	Typical	25 %, in 2 in.	25 %, in 51 mm	
Brinell Hardness				
3000 kg load	Typical	159	159	
Compressive Strength				
0.001 in. set/in.	Typical	35 ksi	240 MPa	
0.01 in. set/in.	Typical	48 ksi	330 MPa	
0.1 in. set/in.	Typical	100 ksi	689 MPa	
Impact Strength				
Izod	Typical	20 ft-lb	27 J	
Charpy V-Notch	Typical	10 ft-lb	14 J	
	Typical	16 ft-lb	22 J	
Fatigue Strength				
at 10 ⁸ cycles	Typical	31 ksi	214 MPa	

Mechanical Properties*

<i>M02 - AS CENTRIFUGAL CAST</i>		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	85 ksi	585 MPa	ASTM B 271; SAE J462-A
Yield Strength				
0.5% Ext. under load	Minimum	35 ksi	240 MPa	ASTM B 271; SAE J462-A
Elongation	Minimum	15 %, in 2 in.	15 %, in 51 mm	ASTM B 271; SAE J462-A

<i>M05 - AS PERMANENT MOLD CAST</i>		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	90 ksi	620 MPa	ASTM B 806
	Typical	96 ksi	660 MPa	
Yield Strength	Minimum	40 ksi	275 MPa	ASTM B 806
0.5% Ext. under load	Typical	52 ksi	360 MPa	
Elongation	Minimum	15 %, in 2 in.	15 %, in 51 mm	ASTM B 806
	Typical	17 %, in 2 in.	17 %, in 51 mm	
Rockwell Hardness				
B scale	Typical	88	88	

<i>M07 - AS CONTINUOUS CAST</i>		US Customary	Metric	Applicable Specifications
Tensile Strength	Minimum	85 ksi	586 MPa	ASTM B 505
	Minimum	90 ksi	620 MPa	SAE J462-B
Yield Strength				
0.5% Ext. under load	Minimum	35 ksi	241 MPa	ASTM B 505
	Minimum	38 ksi	260 MPa	SAE J462-B
Elongation	Minimum	18 %, in 2 in.	18 %, 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.