



Material Data Sheet 953

Copper-Aluminum-Iron (Aluminum Bronze)

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

| | Cu* | Pb | Fe | Ni | Al | Mn | Mg | Si | Zn | Sn |
|----------------|------------------|-----------|---------------|-----------|-----------------|-----------|-----------|-----------|-----------|-----------|
| Min/Max | 86.0 min. | - | .8-1.5 | - | 9.0-11.0 | - | - | - | - | - |
| Nominal | 89.0 | - | 1.0 | - | 10.0 | - | - | - | - | - |

*Cu + Sum of Named Elements, 99.5% min.

Applicable Specifications

| Process or Ingot | Specification |
|------------------|-------------------------------------|
| Sand | ASTM B 148, B 763 SAE J461, J462 |

Fabrication Practices

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

Physical Properties

| | US Customary | Metric |
|----------------------------------|--------------------------------------------------|-------------------------------------------|
| Melting Point - Liquidus | 1913 F | 1045 C |
| Melting Point - Solidus | 1904 F | 1040 C |
| Density | 0.272 lb/in ³ at 68 F | 7.53 gm/cm ³ @ 20 C |
| Specific Gravity | 7.53 | 7.53 |
| Electrical Resistivity | 80.2 ohms-cmil/ft @ 68 F | 13.33 microhm-cm @ 20 C |
| Electrical Conductivity | 13 %IACS @ 68 F | 0.075 MegaSiemens/cm @ 20 C |
| Thermal Conductivity | 36.3 Btu · ft/(hr · ft ² · °F) at 68F | 62.8 W/m · °K 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) |
| Specific Heat Capacity | 0.09 Btu/lb/°F at 68 F | 377.1 J/kg · °K at 293 K |
| Modulus of Elasticity in Tension | 16000 ksi | 110000 MPa |
| Magnetic Permeability | 1.07 | 1.07 |

Heat Treatment

Stress Relieving:
600° F (315C) for 1h/in. of Section Thickness

Solution Anneal:
1585°-1635° F (870-910 C) 1h/WQ

Tempering:
1150°-1225° F (620-665C) for 1h/AC

This alloy may be sensitive to water-quench cracking in heavy casting sections. Oil quenching or forced-air cooling may be preferred.

Machinability Rating: 55
(C36000, Free Cutting Brass = 100)

Mechanical Properties

| | | US Customary | Metric | Applicable Specification |
|------------------------------------------|---------|----------------|----------------|-------------------------------|
| Tensile Strength | Minimum | 65 ksi | 448 MPa | ASTM B 148, B 763 |
| | Minimum | 65 ksi | 450 MPa | SAE J462-A |
| | Typical | 75 ksi | 517 MPa | |
| Yield Strength (0.5% Ext. under load) | Minimum | 25 ksi | 172 MPa | ASTM B 148, B 763 |
| | Minimum | 25 ksi | 170 MPa | SAE J462-A |
| | Typical | 27 ksi | 186 MPa | |
| Elongation | Minimum | 20 %, in 2 in. | 20 %, in 51 mm | ASTM B 148, B 763, SAE J462-A |
| | Typical | 25 %, in 2 in. | 25 %, in 51 mm | |
| Brinell Hardness (3,000 kg load) | Minimum | 110 | 110 | ASTM B 148, B 763 |
| | Typical | 140 | 140 | |

Typical Uses:

Nuts
Cams
Gears
Pickling Hooks and Baskets
Steel Mill Slippers
Welding Jaws
Marine Equipment

6300 West Ridge Road, Erie, PA 16506

Phone: 814-838-8602 • Fax: 814-838-8917 • Sales@ErieBronze.com