



Material Data Sheet

863

Manganese Bronze (High Strength Yellow Brass)

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

| | Cu* | Sn | Pb | Zn | Fe | Ni | Al | Mn | Si |
|----------------|------------------|------------|------------|------------------|----------------|------------|----------------|----------------|-----------|
| Min/Max | 60.0-66.0 | .20 | .20 | 22.0-28.0 | 2.0-4.0 | 1.0 | 5.0-7.5 | 2.5-5.0 | - |
| Nominal | 63.0 | - | - | 25.0 | 3.0 | - | 6.2 | 3.7 | - |

*Cu + Sum of Named Elements. 99.0% min.
In determining Cu min., Cu may be calculated as Cu + Ni,

Applicable Specifications

| Process or Ingot | Specification |
|------------------|-------------------------|
| Sand | AMS 4862 |
| | ASTM B 22, B 584, B 763 |
| | SAE J461, J462 |

Fabrication Practices

| Joining Technique | Suitability |
|--------------------------|-------------|
| Soldering | Poor |
| Brazing | Poor |
| Oxyacetylene Welding | Poor |
| Gas Shielded Arc Welding | Poor |
| Coated Metal Arc Welding | Good |

Physical Properties

| | US Customary | Metric |
|----------------------------------|--|---|
| Melting Point - Liquidus | 1693 F | 923 C |
| Melting Point - Solidus | 1625 F | 885 C |
| Density | 0.283 lb/in ³ @ 68 F | 7.83 gm/cm ³ @ 20 C |
| Specific Gravity | 7.83 | 7.83 |
| Electrical Resistivity | 130.8 ohms-cmil/ft @ 68 F | 21.74 microhm-cm @ 20 C |
| Electrical Conductivity | 8 %IACS @ 68 F | 0.046 MegaSiemens/cm @ 20 C |
| Thermal Conductivity | 20.5 Btu · ft/(hr · ft ² · °F) at 68F | 35.5 W/m · °K at 20 C |
| Coefficient of Thermal Expansion | 12.0 · 10 ⁻⁶ per °F (68-572 F) | 21.6 · 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 | 14200 ksi | 97900 MPa |
| Magnetic Permeability | 1.09 | 1.09 |

Heat Treatment

Stress Relieving:
500° F (260C) for 1h/in. of Section Thickness

Cannot be strengthened by heat treatment

Machinability Rating: 80
(C36000, Free Cutting Brass = 100)

Typical Uses:

Slow Speed Heavy Duty Load Bearings
Extra Heavy Duty High Strength Alloy
Bridge Turntable and Wear Hardware
Screwdown Nuts
Gears
Gibs and Cams
Hydraulic Cylinder Parts
Large Valve Stems

Mechanical Properties

| | | US Customary | Metric | Applicable Specification |
|--|---------|----------------|----------------|-------------------------------------|
| Tensile Strength | Minimum | 110 ksi | 760 MPa | ASTM B 22 |
| | Minimum | 110 ksi | 758 MPa | ASTM B 584, B 763 |
| | Minimum | 110 ksi | 760 MPa | SAE J462-A |
| | Typical | 119 ksi | 821 MPa | |
| Yield Strength (0.5% Ext. under load) | Minimum | 60 ksi | 415 MPa | ASTM B 22 |
| | Minimum | 60 ksi | 414 Mpa | ASTM B 584, B 763 |
| | Typical | 67 ksi | 462 Mpa | |
| | Minimum | 60 ksi | 415 MPa | SAE J462-A |
| Elongation | Minimum | 12 %, in 2 in. | 12 %, in 51 mm | ASTM B 22, B 584, B 763, SAE J462-A |
| | Typical | 18 %, in 2 in. | 18 %, in 51 mm | |
| Brinell Hardness (3,000 kg load) | Minimum | 223 | 223 | ASTM B 22 |
| | Typical | 225 | 225 | |

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