# C93800

| Continuous cast | |
|---|---|
| Product description | High-leaded tin bronze |
| Solids | 1/2" to 13" O.D. |
| Tubes | 1" to 16" O.D. |
| Rectangles | Up to 20" |
| Standard lengths | 144" |
| Shape/form | Semi-finished, mill stock or near-net shapes, anode, bar stock, billet/bloom, squares, hex, plate, profile or structural shape, flats/ rectangular bar |

## Similiar or equivalent specification

| CDA | ASTM | SAE | AMS | Federal | Military | Other |
|---|---|---|---|---|---|---|
| C93800 | B505<br>B505M | J461<br>J462 | | QQ-C-390, E6<br>QQ-B-1005, Comp 19 | MIL-B-11553, Comp 19 | Anti-acid metal<br>SAE 67 |

## Chemical composition

| Cu (%) | Pb (%) | Sn (%) | Zn (%) | Fe (%) | P (%) | Ni (%)[1] | Al (%) | S (%) | Sb (%) | Si (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.00-79.00 | 13.00-16.00 | 6.30-7.50 | 0.80 | 0.15 | 1.50 | 1.00 | 0.005 | 0.08 | 0.80 | 0.005 |

*Chemical composition according to ASTM B505/B505M-23*

*[1]Ni value includes Co.*
*Note: Cu + sum of named elements, 99.0% min. Single values represent maximums.*

# Machinability

| Copper alloy UNS no. | Machinability rating | Density (lb/in$^3$ at 68 $^\circ$F) |
|---|---|---|
| C93800 | 80 | 0.334 |

# Typical uses

## Industrial

Acid resisting applications, backs for lined journal bearings for locomotives, backs for lined journal bearings for passenger cars, bearings, freight car bearings, general service bearings for moderate pressure, industrial centrifuges, low-friction/ moderate pressure bushings, machine parts, pump bodies for acid mine water, pump impellers for acid mine water, pumps, railroad applications, railroad engine casings, wearing material for rod bushings, wearing material for shoes, wearing material for wedges

## Marine

Large bearings for ships

## Mechanical properties

| Tensile strength, min | | Yield strength, at 0.5% extension under load, min | | Elongation, in 2 in. or 50 mm, min | Brinell hardness (500 kg load) | Remarks |
|---|---|---|---|---|---|---|
| ksi | MPa | ksi | MPa | % | typical BHN | |
| 25 | 172 | 16 | 110 | 5 | 55 | |

*Mechanical properties according to ASTM B505/B505M-23*

## Physical properties

| | US customary | Metric |
|---|---|---|
| Melting point – liquidus | 1730 °F | 943 °C |
| Melting point – solidus | 1570 °F | 854 °C |
| Density | 0.334 lb/in³ at 68 °F | 9.25 gm/cm³ at 20 °C |
| Specific gravity | 9.25 | 9.25 |
| Electrical conductivity | 11% IACS at 68 °F | 0.066 MegaSiemens/cm at 20 °C |
| Thermal conductivity | 30.2 Btu/sq ft/ft hr/ °F at 68 °F | 52.3 W/m at 20 °C |
| Coefficient of thermal expansion 68-392 | 10.3 · $10^{-6}$ per °F (68-392 °F) | 17.8 · $10^{-6}$ per °C (20-200 °C) |
| Specific heat capacity | 0.09 Btu/lb/ °F at 68 °F | 377.1 J/kg at 20 °C |
| Modulas of elasticity in tension | 10500 ksi | 72400 MPa |
| Incipient melting | 600 °F | 316 °C |
| Magnetic permeability | 1 | 1 |

*Physical properties provided by CDA*

## Fabrication properties

| Technique | Suitability |
|---|---|
| Soldering | Good |
| Brazing* | Poor |
| Oxyacetylene welding | Not recommended |
| Gas shielded arc welding | Not recommended |
| Coated metal arc welding | Not recommended |
| Machinability rating | 80 |

*Fabrication properties provided by CDA*

**Since brazing is performed within the hot-short range, strain must be avoided during brazing and cooling.*

## Casting characteristics

| Casting attribute | Level |
|---|---|
| Casting yield | High |
| Drossing | Low |
| Effect of section size | Low |
| Fluidity | High |
| Gassing | Medium |
| Patternmakers shrinkage (inches per foot) | 1/8 |
| Shrinkage in solidification | Low |

*Casting characteristics provided by CDA*