

C52100

Continuous cast and drawn

Product description	Phosphor bronze 8% C
Tempers	H04 hard
Solids	3/8" to 2 1/2" O.D.
Hex	3/8" to 2" O.D.
Standard lengths	144"

Similar or equivalent specification

CDA	ASTM	SAE	AMS	Federal	Military	Other
C52100	B139 B139M					

Chemical composition

Cu (%)	Pb (%)	Sn (%)	Zn (%)	Fe (%)	P (%)
Remain	0.05	7.00-9.00	0.20	0.10	0.03-0.35

Chemical composition according to ASTM B139/B139M-12(2017)

Note: Cu + sum of named elements, 99.5% min. Single values represent maximums.

Typical uses

Architecture

Bridge bearing plates

Building

Thermostat bellows

Consumer

Coinage, cymbals, power conductor for electro-surgical pencil

Electrical

Cold headed parts, electrical connectors, electrical flexing contact blades, electronic connectors, fuse clips, switch parts, wire brushes

Fasteners

Cotter pins, heavy duty fasteners, lock washers

Industrial

Beater bar, bellows, bourdon tubing, chemical hardware, heavy duty clips, clutch disks, cold headed parts, diaphragms, doctor blades for the paper industry, gears, perforated sheets, pinions, pneumatic hammers, sleeve bushings, heavy duty springs, helical extension springs, helical torsion springs, textile machinery, thrust bearings, truss wire, welding wire, well drill equipment

Marine

Marine parts

C52100 continued

Machinability

Copper alloy UNS no.	Machinability rating	Density (lb/in ³ at 68° F)
C52100	20	0.318

Mechanical properties

Mechanical properties according to ASTM B139/B139M-12(2017)

C52100

H04 hard

Size range ¼" to ½" round and hexagonal inclusive

Tensile strength, min		Yield strength, at 0.5% extension under load, min		Elongation, 4x diameter or specimen thickness, min	Rockwell "B" hardness	Remarks
ksi	MPa	ksi	MPa	%	typical HRB	
85	585			12	93	

Size range over ½" to 1" round and hexagonal inclusive

Tensile strength, min		Yield strength, at 0.5% extension under load, min		Elongation, 4x diameter or specimen thickness, min	Rockwell "B" hardness	Remarks
ksi	MPa	ksi	MPa	%	typical HRB	
75	515			15	93	

Size range over 1" round and hexagonal

Tensile strength, min		Yield strength, at 0.5% extension under load, min		Elongation, 4x diameter or specimen thickness, min	Rockwell "B" hardness	Remarks
ksi	MPa	ksi	MPa	%	typical HRB	
60	415			20	93	

Physical properties

	US customary	Metric
Melting point – liquidus	1880 °F	1027 °C
Melting point – solidus	1620 °F	882 °C
Density	0.318 lb/in ³ at 68 °F	8.8 gm/cm ³ at 20 °C
Specific gravity	8.8	8.8
Electrical conductivity	13% IACS at 68 °F	0.076 MegaSiemens/cm at 20 °C
Thermal conductivity	36 Btu/sq ft/ft hr/°F at 68 °F	62.3 W/m at 20 °C
Coefficient of thermal expansion 68-572	10.1 · 10 ⁻⁶ per °F (68-572 °F)	17.4 · 10 ⁻⁶ per °C (20-300 °C)
Specific heat capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 20 °C
Modulus of elasticity in tension	16000 ksi	110310 MPa
Modulus of rigidity	6000 ksi	41370 MPa

Physical properties provided by CDA

Fabrication properties

Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene welding	Fair
Gas shielded arc welding	Good
Coated metal arc welding	Fair
Spot weld	Good
Seam weld	Fair
Butt weld	Excellent
Capacity for being cold worked	Good
Capacity for being hot formed	Poor
Machinability rating	20

Fabrication properties provided by CDA

Thermal properties

Treatment	Minimum*	Maximum*
Annealing	900	1250

Thermal properties provided by CDA

*Temperature is measured in Fahrenheit.

Common fabrication processes

Blanking, drawing, forming and bending, shearing, stamping

Common fabrication processes provided by CDA