

C52100 Lead-Free Replacement

Wrought

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.
Rectangles:	Consult Mill
Standard Lengths:	144"

Typical Uses

Architecture	bridge bearing plates
Building	thermostat bellows
Consumer	power conductor for electro-surgical pencil, coinage, cymbals
Electrical	electronic connectors, electrical connectors, cold headed parts, electrical flexing contact blades, electrical flexing contact blades, wire brushes, switch parts, fuse clips
Fasteners	cotter pins, fasteners, heavy duty, lock washers
Industrial	cold headed parts, thrust bearings, truss wire, pneumatic hammers, doctor blades, paper industry, bourdon tubing, well drill equipment, clutch disks, welding wire, diaphragms, beater bar, bellows, springs, helical extension, helical torsion, clips, heavy duty, gears, pinions, textile machinery, perforated sheets, chemical hardware, springs, heavy duty, sleeve bushings
Marine	marine parts

Similar or Equivalent Specification

CDA	ASTM	Asarcon	SAE	AMS	Federal	Military	Other
C52100	B139 B139M						

Chemical Composition

Cu%	Pb%	Sn%	Zn%	Fe%	P%
Rem.	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.



Machinability

C52100 continued

Copper Alloy UNS No.	Machinability Rating	Density (lb/cu in at 68 °F)
C52100	20	0.318

Mechanical Properties

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

C52100

H04 Hard

SIZE RANGE: ¼" ROUND AND HEXAGONAL TO ½" INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation, in 2 in. or 50 mm min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	typical HRB	
85	585			12	93	

SIZE RANGE: OVER ½" ROUND AND HEXAGONAL TO 1" INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation, in 2 in. or 50 mm 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 .5% Extension Under Load, min		Elongation, in 2 in. or 50 mm min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	typical HRB	
60	415			20	93	

Physical Properties

C52100 continued

	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	360 Btu/sq ft/ft hr/°F at 68 °F	62.3 W/m at 20 °C
Coefficient of Thermal Expansion	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

Joining 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

Fabrication Properties provided by CDA

Thermal Properties

Treatment	Temp./Time - US	Temp./Time - SI
Stress Temperature		
Solution Minimum		
Solution Maximum		
Solution Time		
Solution Medium		
Precipitation Value		
Precipitation Time		
Precipitation Medium		
Annealing Minimum	900	483
Annealing Maximum	1250	677
Annealing Time		
Hot Treatment Minimum		
Hot Treatment Maximum		

Thermal Properties provided by CDA

