

# Bronze C46400

Continuous cast and drawn

Product description	Bronze C46400
Tempers	H02 half hard
Solid rounds	1/2" to 2 3/4" O.D.
Hex	1/2" to 2 3/4" O.D.
Rectangles	Consult mill
Standard lengths	144"

## Typical uses

### Builders Hardware

Lock pins

### Electrical

Precision shipboard equipment

### Fasteners

Bolts, nuts, rivets

### Industrial

Aircraft turnbuckle barrels, balls, bearings, bushings, condenser plates, dies for golf ball production, heat exchanger tubes, hub cones, pressure vessels, structural uses, valve stems, welding rod

### Marine

Decorative fittings, hardware, propeller shafts, shafting, turnbuckles

### Ordnance

Missile components

### Other

Baffle plates and flanges

### Plumbing

Fittings

## Similar or equivalent specification

CDA	ASTM	SAE	AMS	Federal	Military	Other
C46400	B21 B21M	J461 J463		QQ-B-639		

## Chemical composition

Cu (%)	Pb (%)	Sn (%)	Zn (%)	Fe (%)
59.00-62.00	0.20	0.50-1.00	Remain	0.10

Chemical composition according to ASTM B21/B21M-20

Note: Cu + sum of named elements, 99.6% min. Single values represent maximums.

## Machinability

Copper alloy UNS no.	Machinability rating	Density (lb/in <sup>3</sup> at 68 °F)
C46400	30	0.304

C46400 continued

## Mechanical properties

Mechanical properties according to ASTM B21/B21M-20

C46400

H02 half hard

Size range ½" and under

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	%	min to max HRB	
60	414	27	186	22		

Size range over ½" to 1" inclusive rod

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	%	min to max HRB	
60	414	27	186	25	60-80	

Size range over 1" to 2" inclusive rod

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	%	min to max HRB	
58	400	26	179	25	55-80	

Size range over 2" to 3" inclusive rod

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	%	min to max HRB	
54	372	25	172	25	55-80	

Size range over 3" to 4" inclusive rod

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	%	min to max HRB	
54	372	22	152	27	55-80	

## C46400 continued

### Size range over 4"

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	%	min to max HRB	
54	372	22	152	30	55-80	

## Physical properties

	US customary	Metric
Melting point – liquidus	1650 °F	889 °C
Melting point – solidus	1630 °F	888 °C
Density	0.304 lb/in <sup>3</sup> at 68 °F	8.41 gm/cm <sup>3</sup> at 20 °C
Specific gravity	8.41	8.41
Electrical conductivity	26% IACS at 68 °F	0.151 MegaSiemens/cm at 20 °C
Thermal conductivity	67 Btu/sq ft/ft hr/°F at 68 °F	116 W/m at 20 °C
Coefficient of thermal expansion 68-572	11.8 · 10 <sup>-6</sup> per °F (68-572 °F)	20.4 · 10 <sup>-6</sup> 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	15000 ksi	103420 MPa
Modulus of rigidity	5600 ksi	38611 MPa

Physical properties provided by CDA

## Fabrication properties

Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene welding	Good
Gas shielded arc welding	Fair
Coated metal arc welding	Not recommended
Spot weld	Good
Seam weld	Fair
Butt weld	Good
Capacity for being cold worked	Fair
Capacity for being hot formed	Excellent
Forgeability rating	90
Machinability rating	30

Fabrication properties provided by CDA

## Thermal properties

Treatment	Minimum*	Maximum*
Annealing	800	1100
Hot treatment	1200	1500

Thermal properties provided by CDA

\*Temperature is measured in Fahrenheit.

## Common fabrication processes

Blanking, drawing, forming and bending, heading and upsetting, hot forging and pressing, hot heading and upsetting, shearing

Common fabrication processes provided by CDA