

ALLOY 464 AND 485

C46400 (CDA 464) - NAVAL BRASS "LEAD FREE" **C48500 (CDA 485) - NAVAL BRASS "HIGH LEAD"**

Naval Brass C46400 is nominally composed of 60% copper, 39.2% zinc and 0.8% tin. As is typical of brass alloys with the duplex alpha + beta structure, C46400 has good strength and rigidity. By substituting tin for an equal quantity of zinc, a high corrosion resistance to seawater is achieved. The addition of tin also gives the alloy an inherent resistance to dezincification, thereby further inhibiting the impingement by seawater at higher than normal temperatures. The alloy is also noted for its resistance to wear, fatigue, galling, and stress corrosion cracking.

Calculations are theoretically based on the density of C48200 = 0.304 lb/cu in @ 68 F.

C48500 - NAVAL BRASS "HIGH LEADED"- STANDARDS & PROPERTIES **SIZE CHARTS: ROUNDS HEX**

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

	Cu	Fe	Pb	Sn	Zn
Min./Max.	59.0-62.0	.10	1.3-2.2	.50-1.0	Rem.
Nominal	60.5	-	1.8	.7	37.5

Note: Cu + Sum of Named Elements, 99.6% min.

Applicable Specifications

Product	Specification
Bar	ASTM B21 FEDERAL QQ-B-639
Bar, Forging	ASTM B124
Forgings, Die	ASTM B283
Plate	FEDERAL QQ-B-639
Rod	ASTM B21
Rod, Forging	ASTM B124
Shapes	ASTM B21
Shapes, Forging	ASTM B124
Sheet	FEDERAL QQ-B-639
Strip	FEDERAL QQ-B-639

Common Fabrication Processes

Hot Forging and Pressing, Machining

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Spot Weld	Not Recommended
Seam Weld	Not Recommended
Butt Weld	Fair
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Good
Forgeability Rating	90
Machinability Rating	70

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Mechanical Properties (measured at room temperature, 68 F (20 C))

Temper	Section Size	Cold Work	Typ/Min	Temp	Tensile Strength	Yield Strength (0.5% ext. under load)	Yield Strength (0.2% offset)	Yield Strength (0.05% offset)	EI	Rockwell Hardness			Vickers Hard.	Brinell Hard.			Shear Strength	Fatigue Strength*	Izod Impact Strength
										B	C	F 30T		500	500	3000			
	in.	%		F	ksi	ksi	ksi	ksi	%							ksi	ksi	ft-lb	
	mm.			C	MPa	MPa	MPa	MPa								MPa	MPa	J	
Rod																			
H01	1	8	TYP	68	69	46	-	-	20	78	-	-	-	-	-	39	-	0.0	
	25.4			20	476	317	-	-	20	78	-	-	-	-	-	269	-	0.0	
H02	1	20	TYP	68	75	53	-	-	15	82	-	-	-	-	-	40	-	0.0	
	25.4			20	517	365	-	-	15	82	-	-	-	-	-	276	-	0.0	
O60	1	0	TYP	68	57	25	-	-	40	55	-	-	-	-	-	36	-	0.0	
	25.4			20	393	172	-	-	40	55	-	-	-	-	-	248	-	0.0	

Physical Properties

	US Customary	Metric
Melting Point - Liquidus	1650 F	899 C
Melting Point - Solidus	1630 F	888 C
Density	0.305 lb/in ³ at 68 F	8.44 gm/cm ³ @ 20 C
Specific Gravity	8.44	8.44
Electrical Resistivity	39.9 ohms-cmil/ft @ 68 F	6.63 microhm-cm @ 20 C
Electrical Conductivity	26 %IACS @ 68 F	0.152 MegaSiemens/cm @ 20 C
Thermal Conductivity	67.0 Btu · ft/(hr · ft ² ·°F) at 68F	116.0 W/m · °K at 20 C
Coefficient of Thermal Expansion	11.8 · 10 ⁻⁶ per °F (68-572 F)	21.2 · 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	15000 ksi	103400 MPa
Modulus of Rigidity	5600 ksi	38610 MPa

Tempers Most Commonly Used

Flat Products	
BAR, DRAWN	H01, H02, O60

Other	
ROD	H01, H02, O60
SHAPES	H01, OTHER

Typical Uses

- Fasteners**
- Fasteners
- Industrial**
- Screw Machine Parts, Gears, Light Bearings, Valve Stems
- Marine**
- Seawater Valve Stems, Marine Hardware