# C46400

## NAVAL BRASS

## DESCRIPTION

Brass is a 60:40 copper zinc alloy to which about 1% of tin has been added to improve the corrosion resistance, particularly to dezincification. The alloy is a two phase alpha-beta brass, hence has reasonably high strength with lower ductility than the single phase 70:30 or alpha brass. It is used for structural applications and for forgings, especially where contact with sea water is likely to induce corrosion. The mechanical properties are almost indistinguishable from those of 60:40 brass C28000, although the tin addition tends to give slightly higher strength. C46400 can be readily hot worked, and can also be cold worked, but not as easily as the single phase alpha brasses.

## CHEMICAL COMPOSITION

| Elements | Min (%) | Max (%) |
|---|---|---|
| Cu | 59.00 | 62.00 |
| Pb | - | 0.20 |
| Sn | 0.50 | 1.00 |
| Fe | - | 0.10 |
| Total Others | - | 0.50 |
| Zn | Remainder | |

## MECHANICAL PROPERTIES ACCORDING TO ASTM B371 (AS PER TEMPER H02)

| Range (Inch) | From | To | UTS Min (ksi) | PS Min (ksi) | Elongation Min (%) | Hardness Min (HRB) | Hardness Max (HRB) |
|---|---|---|---|---|---|---|---|
| Round (Dia) | 0.059 | 0.500 | 60.00 | 27.00 | 22.00 | - | - |
| | 0.500 | 1.000 | 60.00 | 27.00 | 25.00 | 60.00 | 80.00 |
| | 1.000 | 2.000 | 58.00 | 26.00 | 25.00 | 55.00 | 80.00 |
| | 2.000 | 2.953 | 54.00 | 25.00 | 25.00 | 55.00 | 80.00 |
| Hex (A/F) | 0.118 | 0.500 | 60.00 | 27.00 | 22.00 | - | - |
| | 0.500 | 1.000 | 60.00 | 27.00 | 25.00 | 60.00 | 80.00 |
| | 1.000 | 2.000 | 58.00 | 26.00 | 25.00 | 55.00 | 80.00 |
| | 2.000 | 2.756 | 54.00 | 25.00 | 25.00 | 55.00 | 80.00 |
| Square (A/F) | 0.118 | 0.500 | 60.00 | 27.00 | 22.00 | - | - |
| | 0.500 | 1.000 | 60.00 | 27.00 | 25.00 | 60.00 | 80.00 |
| | 1.000 | 2.362 | 58.00 | 26.00 | 25.00 | 55.00 | 80.00 |
| Rectangle (Thickness) | 0.1181 | 0.500 | 60.00 | 27.00 | 22.00 | - | - |
| | 0.500 | 1.000 | 60.00 | 27.00 | 25.00 | 50.00 | 80.00 |
| | 1.000 | 1.968 | 58.00 | 26.00 | 25.00 | 55.00 | 80.00 |



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## MECHANICAL PROPERTIES ACCORDING TO ASTM B371 (AS PER TEMPER H02)

| Range (Inch) | From | To | UTS Min (MPa) | PS Min (MPa) | Elongation Min (%) | Hardness Min (HRB) | Hardness Max (HRB) |
|---|---|---|---|---|---|---|---|
| Round (Dia) | 3.00 | 12.00 | 415.00 | 185.00 | 22.00 | - | - |
| | 12.00 | 25.00 | 415.00 | 185.00 | 25.00 | 60.00 | 80.00 |
| | 25.00 | 50.00 | 400.00 | 180.00 | 25.00 | 55.00 | 80.00 |
| | 50.00 | 75.00 | 370.00 | 170.00 | 25.00 | 55.00 | 80.00 |
| Hex (A/F) | 3.00 | 12.00 | 415.00 | 185.00 | 22.00 | - | - |
| | 12.00 | 25.00 | 415.00 | 185.00 | 25.00 | 60.00 | 80.00 |
| | 25.00 | 50.00 | 400.00 | 180.00 | 25.00 | 55.00 | 80.00 |
| | 50.00 | 70.00 | 370.00 | 170.00 | 25.00 | 55.00 | 80.00 |
| Square (A/F) | 3.00 | 12.00 | 415.00 | 185.00 | 22.00 | - | - |
| | 12.00 | 25.00 | 415.00 | 185.00 | 25.00 | 60.00 | 80.00 |
| | 25.00 | 50.00 | 400.00 | 180.00 | 25.00 | 55.00 | 80.00 |
| | 50.00 | 60.00 | 370.00 | 170.00 | 25.00 | 55.00 | 80.00 |
| Rectangle (Thickness) | 3.00 | 12.00 | 415.00 | 185.00 | 22.00 | - | - |
| | 12.00 | 25.00 | 415.00 | 185.00 | 25.00 | 60.00 | 80.00 |
| | 25.00 | 50.00 | 400.00 | 180.00 | 25.00 | 55.00 | 80.00 |

## PHYSICAL PROPERTIES

| | |
|---|---|
| Melting Point - Liquidus°F | 1650 |
| Melting Point - Solidus°F | 1630 |
| Densitylb/cu in. at 68°F | 0.304 |
| Specific Gravity | 8.41 |
| Electrical Conductivity% IACS at 68°F | 26 |
| Thermal ConductivityBtu/ sq ft/ ft hr/ °F at 68°F | 67 |
| Coefficient of Thermal Expansion 68-57210$^{-6}$ per °F (68 – 572°F) | 11.8 |
| Specific Heat CapacityBtu/ lb /°F at 68°F | 0.09 |
| Modulus of Elasticity in Tensionksi | 15000 |
| Modulus of Rigidityksi | 5600 |

## 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 |

## TYPICAL USES

› Fasteners › Industrial › Marine



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