

AMS 4640-C63000

Extruded and Drawn

Product Description:	Nickel-Aluminum Bronze
Tempers:	HR50 Drawn and Stress Relieved, or TQ50 Temper Annealed
Solids:	3/8" to 10" O.D.
Hex:	1/2" to 2" O.D.
Standard Lengths:	144"

Typical Uses

Industrial	aircraft parts, balls, bearings, bushings, cams, condenser tube for power stations and desalting units, corrosion-resistant articles, gears, heat exchanger flanges, hydraulic bushings for earth-moving equipment, plunger tips, pump parts, pump shafts, shafting, structural members, tanks, valve balls, valve guides, valve seats, welded piping systems
Marine	bolts, nuts, propellers, pump parts, ship propellers
Plumbing	faucets

Similar or Equivalent Specification

CDA	ASTM	SAE	AMS	Federal	Military	Other
C63000	B150 B150M	J461 J463	4640		QQ-C-465B AMD1	

Chemical Composition

Cu% ¹	Sn%	Zn%	Fe%	Ni%	Al%	Mn%	Si%
Rem.	0.20	0.30	2.00- 4.00	4.00- 5.50	9.00- 11.00	1.50	0.25

Chemical Composition according to AMS 4640

¹Cu value includes Ag.

Note: Cu + Ag + Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

Copper Alloy UNS No.	Machinability Rating	Density (lb/in ³ at 68 ° F)
C63000	30	0.274

Mechanical Properties

Mechanical Properties according to AMS 4640
C63000

HR50 Drawn and Stress Relieved Temper, or TQ50 Temper Annealed

SIZE RANGE: UP TO 1" ROUNDS, HEXAGONS, AND OCTAGONS INCLUSIVE

Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation, in 4D, min	Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HB	
110	760	68	470	10	201-248	

SIZE RANGE: OVER 1" TO 2" ROUNDS, HEXAGONS, AND OCTAGONS INCLUSIVE

Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation, in 4D, min	Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HB	
110	760	60	415	10	201-248	

SIZE RANGE: OVER 2" TO 3" ROUNDS, HEXAGONS, AND OCTAGONS INCLUSIVE

Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation, in 4D, min	Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HB	
105	725	55	380	10	187-241	

SIZE RANGE: OVER 3" TO 5" ROUNDS, HEXAGONS, AND OCTAGONS INCLUSIVE

Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation, in 4D, min	Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HB	
100	690	50	345	10	187-241	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1930 °F	1054 °C
Melting Point – Solidus	1895 °F	1035 °C
Density	0.274 lb/in ³ at 68 °F	7.58 gm/cm ³ at 20 °C
Specific Gravity	7.58	7.58
Electrical Conductivity	7% IACS at 68 °F	0.041 MegaSiemens/cm at 20 °C
Thermal Conductivity	22.6 Btu/sq ft/ft hr/°F at 68 °F	39.1 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9 · 10 ⁻⁶ per °F (68-572 °F)	15.5 · 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	17500 ksi	120650 MPa
Modulus of Rigidity	6400 ksi	44127 MPa

Physical Properties provided by CDA

Fabrication Properties

Technique	Suitability
Soldering	Not Recommended
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Spot Weld	Good
Seam Weld	Good
Butt Weld	Good
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Good
Forgeability Rating	75
Machinability Rating	30

Fabrication Properties provided by CDA

Thermal Properties

Treatment	Minimum*	Maximum*
Annealing	1100	1300
Hot Treatment	1450	1700

Thermal Properties provided by CDA

*Temperature is measured in Fahrenheit.

Common Fabrication Processes

Forging, Hot Forming

Common Fabrication Processes provided by CDA