

C63000

Wrought

| | |
|-----------------------------|---|
| Product Description: | Nickel Aluminum Bronze |
| Tempers: | HR50 Drawn and Stress Relieved (3/8" to 3" OD) TQ50 (over 3" OD) |
| Solids: | 3/8" to 10" OD |
| Hex: | 1/2" to 2" OD |
| Rectangles: | Consult Mill |
| 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 | ASARCON | SAE | AMS | FEDERAL | MILITARY | OTHER |
|--------|---------------|---------|--------------|------|-----------|----------|-------|
| C63000 | B150 B150M | | J461 J463 | 4640 | QQ-C-465B | AMD1 | |

Chemical Composition

| Cu% ¹ | Sn% | Zn% | Fe% | Ni% ² | 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 ASTM B150/B150M-14

¹Cu value includes Ag.

²Ni value includes Co.

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

Machinability

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



Mechanical Properties

C63000 continued

Mechanical Properties according to ASTM B150/B150M-14
C63000

HR50 Drawn and Stress Relieved Temper (3/8" to 3" OD), TQ50 (over 3" OD)

SIZE RANGE: UP TO 1" ROD INCLUSIVE

| Tensile Strength, min | | Yield Strength, at .5% Extension Under Load, min | | Elongation, 4x diameter or specimen thickness | Brinell Hardness (3000 kg load) | Remarks |
|-----------------------|-----|--|-----|---|---------------------------------|---------|
| ksi | MPa | ksi | MPa | % | min to max BHN | |
| 110 | 760 | 68 | 470 | 10 | 201 to 248 | |

SIZE RANGE: OVER 1" TO 2" ROD INCLUSIVE

| Tensile Strength, min | | Yield Strength, at .5% Extension Under Load, min | | Elongation, 4x diameter or specimen thickness | Brinell Hardness (3000 kg load) | Remarks |
|-----------------------|-----|--|-----|---|---------------------------------|---------|
| ksi | MPa | ksi | MPa | % | min to max BHN | |
| 110 | 760 | 60 | 415 | 10 | 201 to 248 | |

SIZE RANGE: OVER 2" TO 3" ROD INCLUSIVE

| Tensile Strength, min | | Yield Strength, at .5% Extension Under Load, min | | Elongation, 4x diameter or specimen thickness | Brinell Hardness (3000 kg load) | Remarks |
|-----------------------|-----|--|-----|---|---------------------------------|---------|
| ksi | MPa | ksi | MPa | % | min to max BHN | |
| 105 | 725 | 55 | 380 | 10 | 187 to 241 | |

SIZE RANGE: OVER 3" TO 5" ROD INCLUSIVE

| Tensile Strength, min | | Yield Strength, at .5% Extension Under Load, min | | Elongation, 4x diameter or specimen thickness | Brinell Hardness (3000 kg load) | Remarks |
|-----------------------|-----|--|-----|---|---------------------------------|---------|
| ksi | MPa | ksi | MPa | % | min to max BHN | |
| 100 | 690 | 50 | 345 | 10 | 187 to 241 | |

SIZE RANGE: OVER 5" ROD

| Tensile Strength, min | | Yield Strength, at .5% Extension Under Load, min | | Elongation, 4x diameter or specimen thickness | Brinell Hardness (3000 kg load) | Remarks |
|-----------------------|-----|--|-----|---|---------------------------------|---------|
| ksi | MPa | ksi | MPa | % | min to max BHN | |
| 100 | 690 | 50 | 345 | 10 | 187 to 241 | |



Physical Properties

C63000 continued

| | 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 · ft/(hr · ft ² · °F) at 68° F | 39.1 W/m at 20° C |
| Coefficient of Thermal Expansion | 9.0 · 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 293° C |
| Modulus of Elasticity in Tension | 17500 ksi | 120650 MPa |
| Modulus of Rigidity | 6400 ksi | 44130 MPa |

Physical Properties provided by CDA

Fabrication Properties

| Joining 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 |

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 | 1100 | 594 |
| Annealing Maximum | 1300 | 705 |
| Annealing Time | | |
| Hot Treatment Minimum | 1450 | 788 |
| Hot Treatment Maximum | 1700 | 927 |

Thermal Properties provided by CDA

