AMS 4598-C72900 (Hardiall®)

Standard-stocked product	Extruded and drawn

Product description	Copper nickel-tin bronze
Tempers	TX 00 solution annealed and spinodal hardened
Tubes	2.36" to 7.25" (59.94 mm to 184.15 mm) O.D.* *Consult mill for other shapes/sizes

Chemical composition								
Ni + Co (%)	Sn (%)	Fe (%)	Zn (%)	Mn (%)	Cb (%)	Mg (%)	Pb (%)	Cu (%)
14.50-15.50	7.50-8.50	0.50	0.50	0.30	0.10	0.15	0.02	Remain

Chemical composition according to AMS 4598

Note: Copper + sum of named elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability rating	Density (lb/in^3)	Density (g/cm^3)
AMS 4598-C72900		0.323	8.94

Typical uses

Aerospace

Brakes, compression fit airframe fasteners, control surface and actuator bushings and bearings, door hardware, electronic system connectors, helicopter controls, hydraulic actuators, landing gear bushings and bearings, steering joints, valves, wheel bearings, wing flap bearings

Electrical

Connectors, contacts, controls, miniaturized sockets, relay elements, switches

Industrial

Springs, wire

Marine

Marine components

Oil and gas

Bearings, bushings, drilling components, sucker rod, valve guide bushing couplings

Mechanical properties

Mechanical properties according to AMS 4598
TX 00 solution annealed and spinodal hardened

Size range 1.10" (28 mm) to 7.25" (184 mm) inclusive nominal outside diameter (tube); forward extruded

Ultimate tensile strength, min		Yield strength, at 0.2% offset, min		Elongation, in 4D, min	Rockwell "C" hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
131	903	104	717	8	30	

Size range 7.25" (184 mm) to 13.6" (330 mm) inclusive nominal outside diameter (tube); back extruded

Ultimate tensile strength, min		Yield strength, at 0.2% offset, min		Elongation, in 4D, min	Rockwell "C" hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
130	896	108	745	5	30	

Physical properties

	US customary	Metric
Melting point – liquidus	2039 °F	1115 °C
Melting point – solidus	1742 °F	950 °C
Density	0.323 lb/in³ at 68 °F	8.94 gm/cm³ at 20 °C
Specific gravity	8.94	8.94
Electrical conductivity	7.8% IACS at 68 °F	0.045 MegaSiemens/cm at 20 °C
Thermal conductivity	17 Btu/sq ft/ft hr/ °F at 68 °F	29.4 W/m at 20 °C
Coefficient of thermal expansion 68-572	9.1 · 10^{-6} per °F (68-572 °F)	15.8 · 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
Modulas of elasticity in tension	18500 ksi	127554 MPa
Modulas of rigidity	7500 ksi	51711 MPa

Physical properties provided by CDA

Fabrication properties

Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene welding	Good
Gas shielded arc welding	Excellent
Coated metal arc welding	Excellent
Spot weld	Excellent
Seam weld	Excellent
Butt weld	Excellent
Capacity for being cold worked	Excellent
Capacity for being hot formed	Good

Fabrication properties provided by CDA

Thermal properties

Treatment	Minimum*	Maximum*
Annealing	1515	
Hot treatment	1200	1600

Thermal properties provided by CDA

**Temperature is measured in Fahrenheit.*