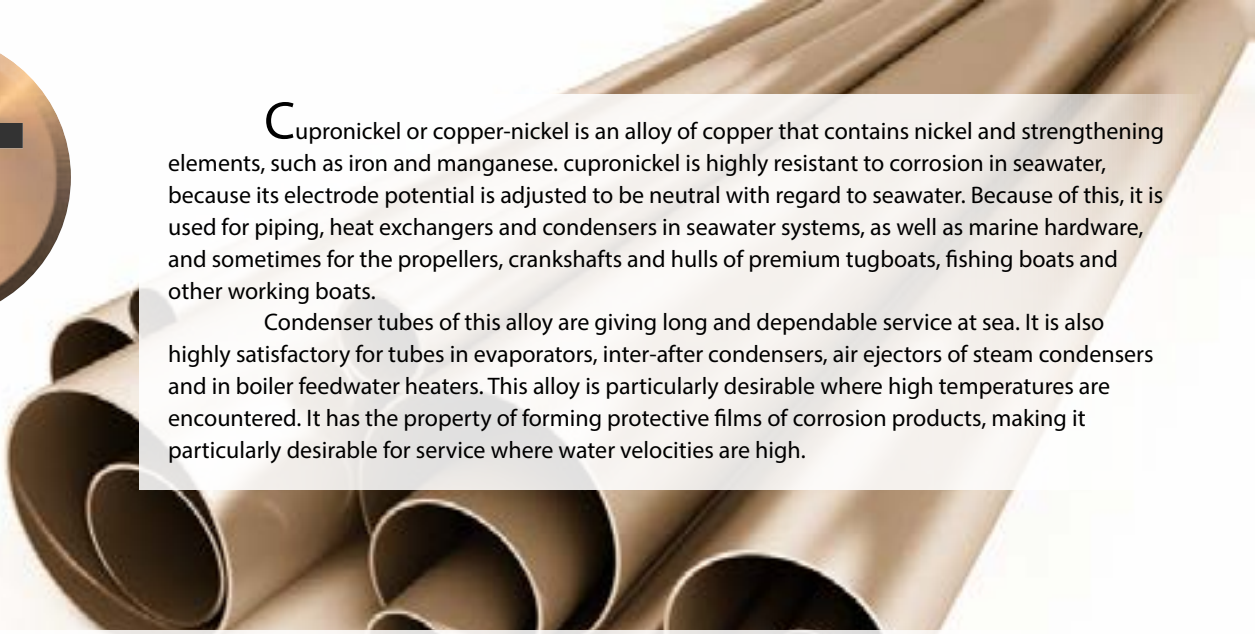
C70600 Copper Nickel 90/10



Cupronickel or copper-nickel is an alloy of copper that contains nickel and strengthening elements, such as iron and manganese. cupronickel is highly resistant to corrosion in seawater, because its electrode potential is adjusted to be neutral with regard to seawater. Because of this, it is used for piping, heat exchangers and condensers in seawater systems, as well as marine hardware, and sometimes for the propellers, crankshafts and hulls of premium tugboats, fishing boats and other working boats.

Condenser tubes of this alloy are giving long and dependable service at sea. It is also highly satisfactory for tubes in evaporators, inter-after condensers, air ejectors of steam condensers and in boiler feedwater heaters. This alloy is particularly desirable where high temperatures are encountered. It has the property of forming protective films of corrosion products, making it particularly desirable for service where water velocities are high.

CHEMICAL COMPOSITION

	Cu[1]	Fe	Pb	Mn	Ni[2]	Zn
MIN/MAX	Rem	1.0-1.8	.05	.07	9.0-11.0	1.0
NOMINAL	88.6	1.4	-	-	10.0	-

[1] Cu value includes Ag. [2] Ni value includes Co./ NOTE: Cu+(sum of named elements)=99.5% min.

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APPLICABLE SPECIFICATIONS

Plate Condenser Tube	Pipe Seamless	Tube Condenser	Tube Finned	Tube U-Bend	Tube, Seamless
ASME SB171 ASTM B171 SAE J463, J461	ASME SB466 ASTM B466	ASME SB111 ASTM B552, B111 MILITARY MIL-T-15005 SAE J463, J461	ASME SB359 ASTM B359 MILITARY MIL-T-22214	ASME SB395 ASTM B395	ASME SB466 ASTM B466, B469 MILITARY MIL-T-16420

FABRICATION PROPERTIES

Soldering	Brazing	Oxyacetylene Welding	Gas Shielded Arc Welding	Coated Metal Arc Welding	Spot Weld	Seam Weld	Butt Weld	Capacity for being Cold Worked	Capacity for being Hot-Formed	Machinabilty Rating
Excellent	Excellent	Fair	Excellent	Good	Good	Good	Excellent	Good	Good	20

PHYSICAL PROPERTIES

Melting Point - Liquidus	Melting Point - Solidus	Density	Specific Gravity	Electrical Resistivity	Electrical Conductivity	Thermal Conductivity	Coefficient of Thermal Expansion	Specific Heat Capacity	Modulas of Elasticity in Tension	Modulus of Rigidity
2100 F	2010 F	0.323 lb/in^3 at 68 F	8.94	115.0 ohms-cmil/ft @ 68F	9 %IACS @ 68 F	26.0 Btu · ft/(hr · ft2·^{O}F)at 68F	9.5 ·10-6 per ^{O}F (68-572 F)	0.09 Btu/lb/^{O}F at 68 F	18000 ksi	6800 ksi
1149 C	1099 C	8.94 gm/cm^3 @ 20 C	8.94	19.12 microhm-cm @ 20C	0.053 MegaSiemens/cm @ 20 C	45.0 W/m · ^{O}K @ 20 C	17.1 ·10-6 per ^{O}C (20-300C)	377.1 J/kg · ^{O}K at 293 K	124000 MPa	46880 MPa

MAXIUM PRESSURE WORK

P = Maxium work pressure(psi)
S = Minimum tensile strength of material for a specific temper(It is the value of the tensile strength in psi in Mechanica properties table)
D = Exterior diameter of tube
T = Wall thickness of tube

$$P = \frac{2T \times S}{5D}$$

NON DESTRUCTIVE TESTS

Eddy Current Testing
Hydrostatic Testing
Air Underwater Testing
Ultrasonic Testing
(PMI) Positive Material Identification

DESTRUCTIVE TESTS

Microstructure Test
Tensile Test
Flattening Test
Expansion Test
Optical Test
Spectrometry Test

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