GNEE METAL

Copper-Nickel Alloy C70600 (CuNi10Fe1Mn)

GNEE's main copper products include copper tubes, copper rods, copper plates, copper wires, copper strips, etc.

Website：chinacopperalloys.com

Email: sales@gneemetal.com

1.0 Overview

Copper Alloy C70600, commonly known as "90-10 Copper-Nickel," is a copper-based alloy containing approximately 10% nickel, 1.4% iron, and minor amounts of manganese. It is one of the most widely used copper-nickel alloys, renowned for its excellent resistance to seawater corrosion, superior biofouling resistance, good fabricability, and high toughness.

2.0 Chemical Composition (Weight % - ASTM B151)

Element	Composition (%)
Copper (Cu)	Balance
Nickel (Ni)	9.0 - 11.0
Iron (Fe)	1.0 - 1.8
Manganese (Mn)	0.5 - 1.0
Zinc (Zn)	1.0 max
Lead (Pb)	0.05 max
Total Other Impurities	0.2 max

3.0 Key Properties

Excellent Corrosion Resistance: Highly resistant to seawater, brackish water, and brine. It exhibits low corrosion rates and superior resistance to stress corrosion cracking and impingement attack.
Antifouling Properties: The corrosion release of copper ions from the surface inhibits the attachment and growth of marine organisms (biofouling).
Good Fabricability: Can be readily hot-worked, cold-worked, annealed, and soldered. It also has good brazing and welding characteristics.
High Thermal Conductivity: Approximately 50 W/m·K, which is lower than pure copper but excellent for heat exchanger applications in corrosive environments.
Mechanical Properties: Combines good strength with excellent ductility and toughness.

4.0 Physical Properties

Property	Value	Unit
Density	8.94	g/cm³
Melting Point	1170	°C
Thermal Conductivity	50	W/(m·K)
Electrical Conductivity	9	% IACS
Modulus of Elasticity	152	GPa

5.0 Mechanical Properties (Typical for Wrought Products)

5.1 Tube (ASTM B111)

Temper	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)
Annealed	275 min	105 min	30 min
Drawn (H58)	360 min	310 min	15 min

5.2 Sheet/Plate (ASTM B171)

Temper	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)
Annealed (O61)	300 min	125 min	30 min

Temper	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)
As-Hot-Rolled (M20)	300 min	125 min	25 min
Hard (H04)	415 min	380 min	5 min

6.0 Fabrication & Processing

Welding: Excellent weldability using gas tungsten arc welding (GTAW/TIG), gas metal arc welding (GMAW/MIG), and shielded metal arc welding (SMAW) with matching C70600 filler metal.
Soldering & Brazing: Good suitability for both soft soldering and brazing with silver-based brazing alloys.
Machining: Rated at 20% on the free-machining brass scale. It is gummy and requires sharp tools, positive rake angles, and adequate cooling.
Cold Working: Excellent ductility allows for extensive cold working processes like bending, drawing, and rolling. Intermediate annealing is recommended after severe cold working.

7.0 Applications

C70600 is the premier alloy for marine engineering applications due to its corrosion resistance.
Marine Systems:
Seawater piping systems
Condenser and heat exchanger tubes
Boat hulls and sheathing
Desalination plant components
Power Generation:
Condenser tubes in coastal power stations
Offshore Oil & Gas:
Platform piping, ballast systems, and splash zone sheathing
Chemical Processing:
Equipment handling salts, acids, and alkalis

8.0 Standards & Specifications

ASTM B111: Seamless Copper Alloy Tubes for Condensers and Heat Exchangers
ASTM B122: Plate, Sheet, Strip, and Rolled Bar
ASTM B151: Rod and Bar
ASTM B171: Plate, Sheet, Strip, and Rolled Bar for Pressure Vessels
UNS: C70600
EN/DIN: CW352H / CuNi10Fe1Mn
Common Forms: Tube, Pipe, Sheet, Plate, Strip, Bar, Wire

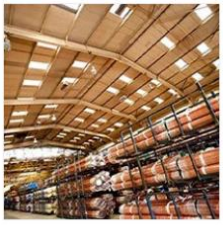
9.0 Comparative Alloy Properties

Property / Grade	C70600 (90-10 CuNi)	C71500 (70-30 CuNi)	C72200 (85-15 CuNi+Cr)	C44300 (Admiralty Brass)
Nominal Composition	CuNi10Fe1Mn	CuNi30Fe1Mn	CuNi16Fe0.5Cr	CuZn28Sn1As
Density (g/cm^3)	8.94	8.94	8.94	8.53
Tensile Strength (MPa) - Annealed	275 - 380	370 - 500	350 - 450	325 - 400
Yield Strength (MPa) - Annealed	105 - 180	140 - 240	120 - 200	125 - 180
Thermal Conductivity (W/m·K)	~50	~29	~37	~111
Seawater Corrosion Resistance	Excellent	Superior	Very Good to Excellent	Good (Limited)
Relative Cost	Medium	High	Medium-High	Low
Key Characteristic	Cost-effective all-rounder	Premium corrosion resistance	Balanced performance & cost	High thermal conductivity, freshwater use

About Us

Plant And Equipment

We rely on a full-process production line of melting, extrusion, drawing, heat treatment and finishing. Our core equipment includes medium-frequency induction furnaces, extruders, cold drawing machines and annealing furnaces, and are equipped with intelligent detection systems to ensure that the copper we produce is of first-class quality and stable performance.










Packaging And Shipping

To ensure our products arrive in perfect condition, we use robust packaging:

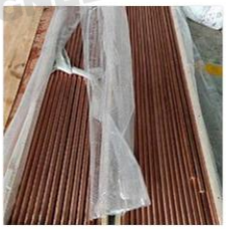
Protective End Caps: Prevent damage to tube ends.

Waterproof Wrapping: Protects against moisture and corrosion during transit.

Secured Bundling: Tubes are bundled and strapped onto wooden crates or pallets.

Clear Labeling: Each bundle is clearly labeled with material grade, heat number, and dimensions.





Founded in 2008, GNEE has many years of experience in copper product export. Headquartered in Henan Province, China, adjacent to the Beijing-Hong Kong-Macao Expressway, the company has over 200 dedicated employees, registered capital of RMB 10 million, and covers an area of over 350,000 square meters. GNEE is SGS-certified.

We provide high-quality copper products, excellent service, and highly competitive pricing. We specialize in the production and manufacturing of copper tubes, rods, sheets, coils, and wire.

Our products are exported to over 160 countries worldwide and are widely used in key sectors such as large-scale pipeline construction, petrochemicals, shipbuilding, the automotive industry, and large power plants.

Website：chinacopperalloys.com
Email: sales@gneemetal.com