C71500 (CuNi30Mn1Fe) Copper Nickel 70/30 Tubes -ASTM B111

ASTM B111 C71500 Copper Nickel Tube is the best resistance of any of the copper alloys to impingement attack and to corrosion from most acids and waters. It is being used in severe corrosive conditions in which service lives longer than those of other copper alloys are desired.





ASTM B111 C71500 CuNi30Mn1Fe Ni-30%

C68700 ASTM B 111/B 111M establishes the requirements for seamless tube and ferrule stock of copper and various copper alloys up to 3 Vs in. [80 mm] inclusive, in diameter, for use in surface condensers, evaporators, and heat exchangers.

Copper or Copper Alloy UNS NO.	Description
C70600	90-10 Copper-Nickel
C71500	70-30 Copper-Nickel

Standard: ASTM B 111/B 111M

Description Name: ASTM B111 copper tubes, C71500 copper tubes, C71500 Copper-Nickel tubes and pipes, CuNi30Mn1Fe Copper Nickel tubes.

Size: 4mm to 90 mm

Wall Thickness: 0.5 to 10mm

Shape: Round

Length: Single random length/ Double random length or as customer's actual request

Grade: C70600, C71500, C71640

Check more about C71500 on our website. **Click**

Referenced Documents:

- ASTM Standards:
- B 153 Test Method for Expansion (Pin Test) of Copper and Copper-Alloy Pipe and Tubing
- B 154 Test Method for Mercurous Nitrate Test for Copper and Copper Alloys
- B 170 Specification for Oxygen-Free Electrolytic Copper Refinery Shapes

Standard Grade	ASTM B 111 C71500	EN 12451 CuNi30Mn1Fe	DIN 17664/1785 CuNi30Mn1Fe	BS 2871 CN107	JIS H3300 C7150
Cu	Bal.	Bal.	Bal.	Bal.	Bal.
Pb	0.05 max.	0.02 max.	0.03 max.	0.01 max.	0.05 max.
Fe	0.4-1.0	0.4-1.0	0.4-1.0	0.4-1.0	0.2-1.0
Ni	29-33	30-32	30-32	30-32	29-33
Zn	1.0 max.	0.5 max.	0.5 max.	-	0.5 max.
S	-	0.05 max.	0.06 max.	0.08 max.	-
P	-	0.02 max.	-	-	-
Mn	1.0 max.	0.5-1.5	0.5-1.5	0.5-1.5	0.2-1.0
C	-	0.05 max.	0.06 max.	0.06 max.	-
Sn	-	0.05 max.	-	-	-
Total Impurltles	-	0.2 max.	0.1 max.	0.3 max.	-
Condition	O61	R370	F37	M	o
	HR50	R480	-	O	-
	-	-	-	-	-
Yield Strength N/mm²	125 min	120 min	120-220	-	-
	345 min	300 min	-	-	-
	-	-	-	-	-
Tensil Strength N/mm²	360 min	370 min	370 min	-	363
	495 min	480 min	-	-	-
	-	480 min	-	-	-
Elongation (%)	-	35 min	35 min	-	30 min
	12 min. (WT < 1.21mm)	12 min	-	-	-
	12 min. (WT < 1.21mm)	-	-	-	-
Hardness Hv5	-	-	-	150 min	-
	-	-	-	90-120	-
	-	-	-	-	-

- B 224 Classification of Coppers
- B 846 Terminology for Copper and Copper Alloys

- B 858 Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys
- E 8 Test Methods for Tension Testing of Metallic Materials E 8M Test Methods for Tension Testing of Metallic Materials [Metric]
- E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- E 53 Test Methods for Determination of Copper in Unalloyed Coppers by Gravimetry
- E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes5
- E 62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods
- E 75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys
- E 76 Test Methods for Chemical Analysis of Nickel-Copper Alloys
- E 112 Test Methods for Determining Average Grain Size E 243 Practice for Electromagnetic (Eddy Current) Examination of Copper and Copper-Alloy Tubes
- E 255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition
- E 478 Test Methods for Chemical Analysis of Copper Alloys
- E 527 Practice for Numbering Metals and Alloys (UNS)

C71500 Copper Nickel tube Chemical Composition:

Copper Nickel Tube Tensile Requirements

Copper or Copper Alloy UNS NO.	Temper Designation		Tensile Strength	Yield Strength
	Standard	Former	min ksi	min ksi
C70600	H55	light-drawn	45	15
C71500	O61	annealed	52	18
C71640	O61	annealed	63	25

Expansion Test

- C71500 (CuNi30Mn1Fe) Copper Nickel Tube specimens selected for test shall withstand the expansion shown in standard when expanded in accordance with Test Method B 153. The expanded tube shall show no cracking or rupture visible to the unaided eye.
- Hard-drawn tubes not end annealed are not subject to this test. When tubes are specified end annealed, this test is required and shall be performed on the annealed ends of the sampled tubes.
- Tubes for ferrule stock are not subject to the expansion test.

Flattening Test

- Test Method: Each test specimen shall be flattened in a press at three (3) places along the length, each new place to be rotated on its axis approximately one third turn from the last flattened area. Each flattened area shall be at least 2 in. in length. A flattened test-specimen shall allow a micrometer caliper set at three (3) times the wall thickness to pass freely over the flattened area. The flattened areas of the test specimen shall be inspected for surface defects.

- During inspection, the flattened areas of the test- specimen shall be free of defects, but blemishes of a nature that do not interfere with the intended application are acceptable.
- Tubes for ferrule stock are not subject to flattening test.

Residual Stress Test

- A residual stress test is required to be performed only for Copper Alloy UNS Nos. C70600, C71500, C71640.
- Unless otherwise specified, the producer shall have the option of testing the product to either the mercurous nitrate test, Test Method B 154, or the ammonia vapor test, Test Method B 858, as prescribed below.

Nondestructive Testing

Eddy-Current Test—Each C71500 (CuNi30Mn1Fe) Copper Nickel tube shall be passed through an eddy-current testing unit adjusted to provide information on the suitability of the tube for the intended application. Testing shall follow the procedures of Practice E 243.

Hydrostatic Test

Each Copper Nickel tube shall stand, without showing evidence of leakage, an internal hydrostatic pressure sufficient to subject the material to a fiber stress of 7000 psi [48 MPa] as determined by the following equation for thin hollow cylinders under tension. The tube need not be tested at a hydrostatic pressure of over 1000 psi [7.0 MPa] unless so specified.

P 5 2St/~D 2 0.8t

where:

P = hydrostatic pressure, psi [MPa];

t = thickness of tube wall, in. [mm];

D = outside diameter of the tube, in. [mm]; and S = allowable stress of the material, psi [MPa].

Materials and Manufacture:

- When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed in this specification and requirements have been met.
- When identified in the ordering information that product is purchased for ASME Boiler and Pressure Vessel Code applications, certification to this specification is mandatory.

Note:

- Mill test certificates will be issued EN10204 3.1 or 3.2
- All tubes shall be supplied as per applicable ASTM B111 /B 111M Specification.

Related Copper Alloy Tubes

Material Designation	Corresponding Material Symbol				
	GB/T8890	ASTM B111	BS2871	JIS H3300	DIN1785
Copper-Nickel	BFe10-1-1	C70600	CN102	C7060	CuNi10Fe1Mn
	BFe30-1-1	C71500	CN107	C7150	CuNi30Mn1Fe
	(BFe30-2-2)	C71640	CN108	C7164	CuNi30Fe2Mn2
	(BFe5-1.5-0.5)	C70400	-	-	-
	B7	-	-	-	-
Aluminum Brass	HAL77-2	C68700	CZ110	C6870	CuZn20Al2
Admiralty Brass	HSn70-1	C44300	CZ111	C4430	CuZn28Sn1
Boric Brass	Hsn70-18	-	-	-	-
	HSn70-1 AB	-	-	-	-
Arsenical Brass	H68A	-	CZ126	-	-
Brass Tube	H65/H63	C28000/C27200	CZ108	C2800/C2700	CuZn36/CuZn37

Copper and Brass Tubes Standard Information:

COUNTRY	STANDARD	Name
U.S.A.	ASTM B111	Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
China	GB/T8890	Seamless Copper alloy Heat exchanger tubes
U. K	BS2871	Copper and Copper Alloys Tubes
Japan	JIS H3300	Copper and Copper Alloy-Seamless Pipes and Tubes
Germany	DIN1785	Wrought copper and copper alloy tubes for condensers and heat exchangers