

ASTM B165 / ASME SB 165

SPECIFICATION FOR NICKEL-COPPER ALLOY (UNS N04400) SEAMLESS PIPE AND TUBE

This specification covers nickel-copper alloy UNS N04400 in the form of cold-worked seamless pipe and Tube.

A. Chemical Composition :-

The material shall conform to the composition limits specified in Table 1.

Table 1

Element	Composition Limits, %	Product (Check) Analysis Variations, under min or over max, of the Specified Limit of Element
Ni ^A	63.0 min	0.45
Cu	28.0 min	0.15
	34.0 max	0.2
Fe	2.5 max	0.05
Mn	2.0 max	0.04
C	0.3 max	0.02
Si	0.5 max	0.03
S	0.024 max	0.005

^A Element shall be determined arithmetically by difference.

B. Mechanical and Other Requirements :-

1. Tension Test — The material shall conform to the tensile properties specified in Table 2.
2. Hydrostatic Test — If any pipe or tube shows leaks during hydrostatic testing, it shall be rejected.

Table 2

Condition and Size	Tensile Strength, min, psi (MPa)	Yield Strength, min. (0.2% offset), min, psi (MPa)	Elongation in 2 in. or 50 mm (or 4D), min, %
Annealed:			
5 in. (127 mm) outside diameter and under	70000(480)	28000(195)	35
Over 5 in. (127 mm) outside diameter	70000(480)	25000(170)	35
Stress-Relieved			
All sizes	85000(585)	55000(380)	15

C. Test Methods :-

1. Chemical Composition — In case of disagreement, the chemical composition shall be determined in accordance with Test Methods E 76.
2. Tension Test — Tension testing shall be conducted in accordance with Test Methods E 8.
3. Hydrostatic Test — Each pipe or tube with an outside diameter 1/8 in. (3 mm) and larger and with wall thickness of 0.015 in. (0.38 mm) and over shall be tested by the manufacturer to an internal hydrostatic pressure of 1000 psi (6.9 MPa) provided that the fiber stress calculated in accordance with the following equation does not exceed the allowable fiber stress, S, indicated below:

$$P = 2St/D$$

where: P = hydrostatic test pressure, psi (or MPa)

S = allowable fiber stress, for material in the condition (temper) furnished as follows:

Annealed:

5 in. (127 mm) outside diameter and under 17500 psi (120 MPa)

Over 5 in. (127 mm) outside diameter 16700 psi (115 MPa)

Stress-relieved

All sizes 21200 psi (145 MPa)

t = minimum wall thickness, in. (or mm), equal to the specified nominal wall minus the permissible minus wall tolerance, or the specified minimum wall thickness
D = outside diameter of the pipe or tube, in. (or mm).

D. Length :-

When material is ordered cut-to-length, the length shall conform to the permissible variations prescribed in Table 3.

Table 3^A

Outside Diameter, in. (mm)	Cut Length, in. (mm)	
	Over	Under
Under 2 (50.8)	1/8 (3.2)	0
2 (50.8) and over	3/16 (4.8)	0

^A These permissible variations in length apply to pipe or tube in straight lengths. They apply to cut lengths up to and including 24 ft (7.3 m). For lengths over 24 ft, an additional over-tolerance of 1/8 in. (3.2 mm) for each 10 ft (3.0 m) or fraction thereof shall be permissible up to a maximum additional over-tolerance of 1/2 in. (12.7 mm).

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