

# ASTM B161 / ASME SB161

## SPECIFICATION FOR NICKEL SEAMLESS PIPE AND TUBE

This specification covers nickel (UNS N02200) and low-carbon nickel (UNS N02201) in the form of coldworked seamless pipe and tube.

**A. General Requirement :-**

1. Material furnished under this specification shall conform to the applicable requirements of Specification B 829 unless otherwise provided herein.

**B. Chemical Composition :-**

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

**Table 1**

Element	Nickel (UNS N02200)	Low-Carbon Nickel (UNS N02201)
Ni <sup>A</sup> , min	99	99
Cu, max	0.25	0.25
Fe, max	0.4	0.4
Mn, max	0.35	0.35
C, max	0.15	...
C, max	...	0.02
Si, max	0.35	0.35
S, max	0.01	0.01

<sup>A</sup> Element shall be determined arithmetically by difference.

**C. Mechanical and Other Properties :-**

1. Tension Test —
  - i. The material shall conform to the tensile properties specified in Table 2. The sampling and specimen preparation are as covered in Specification B 829.
  - ii. Tensile properties for material specified as small-diameter and light-wall tube (converter sizes) shall be as prescribed in Table 3.

**Table 2**

Condition and Size	Tensile Strength, min, psi (MPa)		Yield Strength (0.2 % offset), min, psi (MPa)		Elongation in 2 in. or 50 mm (or 4D), min, %	
	Nickel (UNS N02200)	Low-Carbon Nickel (UNS N02201)	Nickel (UNS N02200)	Low-Carbon Nickel (UNS N02201)	Nickel (UNS N02200)	Low-Carbon Nickel (UNS N02201)
Anneal ed:						
5 in. (127 mm) and under outside diameter	55000 (380)	50000 (345)	15000 (105)	12000 (80)	35	35
Over 5 in. (127 mm) in outside diameter	55000 (380)	50000 (345)	12000 (80)	10000 (70)	40	40
Stress-Relieved:						
All sizes	65000 (450)	60000 (415)	40000 (275)	30000 (205)	15	15

**Table 3<sup>A</sup>**

Condition	Tensile Strength, psi (MPa)	Yield Strength (0.2 % offset), min, psi (MPa)	Elongation in 2 in. or 50 mm, min, %
Nickel UNS N02200			
Annealed <sup>B</sup>	75000 (515) max	15000 (105)	33
Half-hard <sup>C</sup>	80000 (550) min	4000 (275)	12
Full hard <sup>D</sup>	95000 (655) min	75000 (515)	4
Low-Carbon Nickel UNS N02201			
Annealed <sup>B</sup>	70000 (480) max	12000 (85)	35
Half-hard <sup>C</sup>	70000 (480) min	30000 (205)	12
Full hard <sup>D</sup>	85000 (585) min	65000 (450)	4

<sup>A</sup> Not applicable to outside diameters under 1/8 in. (3.2 mm) and wall thicknesses under 0.015 in. (0.38 mm).

<sup>B</sup> This condition is sometimes designated as “No. 1 Temper.”

<sup>C</sup> This condition is sometimes designated as “No. 2 Temper.”

<sup>D</sup> This condition is sometimes designated as “No. 3 Temper.”

2. Hydrostatic Test or Non-destructive Electric Test—

- i. Each pipe or tube shall be subjected to the Non-destructive Electric Test or the Hydrostatic Test. Unless specified by the purchaser, either test may be used at the option of the producer.

**D. Test Methods :-**

1. Hydrostatic Test —

- i. 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 in accordance with Specification B 829. The allowable fiber stress, for material in the condition furnished, is as follows:

	UNS N02200	UNS N02201
<b>Annealed:</b>		
5 in. (127 mm) outside diameter and under	10000 psi (70 MPa)	8000 psi (55 MPa)
Over 5 in. outside diameter	8000 psi (55 MPa)	6700 psi (45 MPa)
<b>Stress-Relieved:</b>		
All sizes	16200 psi (110 MPa)	15000 psi (105 MPa)

- ii. When so agreed upon by the manufacturer and purchaser, pipe or tube may be tested to 1(1/2) times the allowable fiber stress given above.

2. Non-destructive Electric Test —

- i. Each pipe or tube shall be examined with a non-destructive electric test as prescribed in Specification B 829.

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