

# ASTM B515 / ASME SB515

## SPECIFICATION FOR WELDED UNS N08120, UNS N08800, UNS N08810, AND UNS N08811 ALLOY TUBES

This specification covers welded UNS N08120, UNS N08800, UNS N08810 and UNS N08811 alloy boiler, heat exchanger, and condenser tubes for general corrosion resisting and low or high-temperature service.

This specification covers tubes 1/8 to 5 in. (3.18 to 127 mm), inclusive, in outside diameter and 0.015 to 0.500 in. (0.38 to 12.70 mm), inclusive, in wall thickness. Table 2 of Specification B751 lists the dimensional requirements of these sizes.

Tubes having other dimensions may be furnished provided such tubing complies with all other requirements of this specification.

### A. Chemical Composition :-

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

**Table 1**

Element	UNS N08120	UNS N08800	UNS N08810	UNS N08811
Nickel, min	35.0	30.0	30.0	30.0
Nickel, max	39.0	35.0	35.0	35.0
Chromium, min	23.0	19.0	19.0	19.0
Chromium, max	27.0	23.0	23.0	23.0
Iron, min	remainder	39.5 (A)	39.5 (A)	39.5 (A)
Manganese, max	1.5	1.5	1.5	1.5
Carbon, min	0.02	...	...	...
Carbon, max	0.1	0.1	0.05-0.10	0.06-0.10
Copper, max	0.5	0.75	0.75	0.75
Silicon, max	1.0	1.0	1.0	1.0
Sulfur, max	0.03	0.015	0.015	0.015
Aluminum, min (B)	...	0.15	0.15	0.15
Aluminum, max	0.4	0.6	0.6	0.6
Titanium, min (B)	...	0.15	0.15	0.15
Titanium, max	0.2	0.6	0.6	0.6
Columbium, min	0.4	...	...	...
Columbium, max	0.9	...	...	...
Molybdenum, max	2.5	...	...	...
Phosphorus, max	0.04	...	...	...
Tungsten, max	2.5	...	...	...
Cobalt, max	3.0	...	...	...
Nitrogen, min	0.15	...	...	...
Nitrogen, max	0.3	...	...	...
Boron, max	0.01	...	...	...

(A) Iron shall be determined arithmetically by difference.

(B) Alloy UNS N08811: Al + Ti, 0.85–1.20.

### B. Mechanical and Other Properties :-

1. Mechanical Properties—The material shall conform to the mechanical property requirements specified in Table 2.

**Table 2**

Alloy	Condition (Temper)	Tensile Strength, min, psi (MPa)	Yield Strength, 0.2% Offset, min, psi (MPa)	Elongation in 2 in. or 50 mm, min, %
UNS N08120	annealed	90000 (621)	40000 (276)	30
UNS N08800	annealed	75000 (520)	30000 (205)	30
UNS N08810 and UNS N08811	annealed	65000 (450)	25000 (170)	30

2. Grain Size — A transverse sample representing the full-wall thickness of annealed alloys UNS N08120, N08810, and N0881 1 shall conform to an average grain size of ASTM No. 5 or coarser.
3. Flattening Test.
4. Flange Test.
5. Non-destructive Test Requirements:
  - i. Class 1 —Each piece of each lot shall be subject to one of the following four tests: hydrostatic, pneumatic (air underwater), eddy current, or ultrasonic.
  - ii. Class 2 — Each piece in each lot shall be subjected to a leak test and an electric test as follows:
    - a. Leak Test — Hydrostatic or pneumatic (air underwater).
    - b. Electric Test — Eddy current or ultrasonic.
  - iii. The manufacturer shall have the option to test Class 1 or Class 2 and select the non-destructive test methods, if not specified by the purchaser.

**C. General Requirements :-**

1. Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification B 751 unless otherwise provided herein.

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