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# Standard Specification for Welded UNS N08020 Alloy Tubes[1]

This standard is issued under the fixed designation B468; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification[2] covers welded UNS N08020 alloy boiler, heat exchanger, and condenser tubes for general corrosion-resisting and low- or high-temperature service.

1.2 This specification covers tubes ⅛ 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.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Safety Data Sheet (SDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*[3]

A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

B751 Specification for General Requirements for Nickel and Nickel Alloy Welded Tube

B899 Terminology Relating to Non-ferrous Metals and Alloys

## 3. Terminology

3.1 *Definitions*—Definitions for terms defined in Terminology B899 shall apply unless otherwise defined by the requirements of this document.

## 4. General Requirements

4.1 Material furnished in accordance with this specification shall conform to the applicable requirements of the current edition of Specification B751 unless otherwise provided herein.

## 5. Ordering Information

5.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Examples of such requirements include, but are not limited to, the following:

5.1.1 Quantity (feet or number of lengths),

5.1.2 UNS number,

5.1.3 Size (outside diameter and minimum or average wall thickness),

5.1.4 Length (random or specific),

5.1.5 ASTM designation,

5.1.6 *Product Analysis*—State if required,

5.1.7 *Certification*—State if a certification or a report of test results is required,

5.1.8 *Purchaser Inspection*—State which tests or inspections are to be witnessed, if any, and

5.1.9 Supplementary requirements, if any.

## 6. Materials and Manufacture

6.1 The tubing shall be made from flat-rolled stock by an automatic welding process with no addition of filler metal. Subsequent to welding and prior to final heat treatment, the material shall be cold-worked in either the weld metal only, or in both the weld and base metal.

6.2 *Heat Treatment*—Tubing of UNS N08020 alloy shall be furnished in the stabilized-annealed condition.

NOTE 1—The recommended annealing temperatures are 1800 to 1850°F (982 to 1010°C) for UNS N08020.

## 7. Chemical Composition

7.1 The material shall conform to the composition limits specified in Table 1. One test is required for each lot as defined in Specification B751.

[1] This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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[2] For ASME Boiler and Pressure Vessel Code applications, see related Specification SB-468 in Section II of that code.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

**TABLE 1 Chemical Requirements**

| Element | Composition,% |
|---|---|
| | UNS N08020 |
| Carbon, max | 0.07 |
| Manganese, max | 2.00 |
| Phosphorus, max | 0.045 |
| Sulfur, max | 0.035 |
| Silicon, max | 1.00 |
| Nickel | 32.00–38.00 |
| Chromium | 19.00–21.00 |
| Molybdenum | 2.00–3.00 |
| Copper | 3.00–4.00 |
| Columbium (Nb) + tantalum | 8 × carbon–1.00 |
| Nitrogen | ... |
| Iron[A] | remainder |

[A] By difference.

**TABLE 2 Mechanical Property Requirements**

| Tensile Strength, min, ksi (MPa) | Yield Strength, min, ksi (MPa) | Elongation in 2 in. (50.8 mm), min, % |
|---|---|---|
| 80 (551) | 35 (241) | 30.0 |

7.2 If a product analysis is performed, it shall meet the chemistry limits prescribed in Table 1, subject to the analysis tolerances specified in Table 6 of Specification B751.

## 8. Mechanical Properties and Other Requirements

8.1 *Mechanical Properties*—The material shall conform to the mechanical property requirements specified in Table 2. One test is required for each lot as defined in Specification B751.

8.2 *Flattening Test*—A flattening test shall be made on each end of one tube per lot. Superficial ruptures resulting from surface imperfections shall not be cause for rejection.

8.3 *Flange Test*—A flange test shall be made on each end of one tube per lot.

8.4 *Nondestructive Test Requirements*—Each tube shall be subjected to either a pressure test or a nondestructive electric test at the manufacturer's option. The purchaser may specify which test is to be used.

## 9. Keywords

9.1 welded tube; N08020

## SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall be applied only when specified by the purchaser in the inquiry, contract, or order:

### S1. Corrosion Tests

S1.1 One intergranular corrosion test per lot shall be performed by the manufacturer on a sensitized specimen and tested in accordance with Practices A262. When this supplementary requirement is specified, the specific practice (Practice B or Practice E) shall also be specified. If Practice B is specified, the specimen must pass with a rate of less than 0.002 in. (0.05 mm) per month. A lot for intergranular corrosion testing shall be the same as for mechanical testing.

S1.1.1 In addition to the anneal recommended in Note 1, the specimen shall be sensitized for 1 h at 1250°F (677°C) before being subjected to corrosion testing.

S1.1.2 If any corrosion test specimen fails the test, the material represented by such specimens may be reheat-treated and resubmitted for test.