



Designation: **B674–05 (Reapproved 2016) B674 – 21**

## Standard Specification for ~~UNS N08925, UNS N08354, and UNS N08926~~ Nickel-Iron- Chromium-Molybdenum and Iron-Nickel-Chromium- Molybdenum-Copper Welded Tube<sup>1</sup>

This standard is issued under the fixed designation B674; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. ~~Scope~~ Scope\*

1.1 This specification covers UNS N08925,<sup>2</sup> UNS N08354, and UNS N08926 welded tube for general corrosion applications.

1.2 This specification covers outside diameter and nominal wall tube.

1.2.1 The tube sizes covered by this specification are  $\frac{1}{8}$  to 5 in. (3.2 to 127 mm) in outside diameter and 0.015 to 0.320 in. (0.38 to 8.13 mm), inclusive, in wall thickness.

1.3 ASTM International has adopted definitions whereby some grades, such as UNS N08904, previously in this specification were recognized as stainless steels, because those grades have iron as the largest element by mass percent. Such grades are under the oversight of ASTM Committee A01 and its subcommittees. The products of N08904 previously covered in this specification are now covered by Specification **A249/A249M**.

1.4 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.

1.5 *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~~ safety, health, and health~~environmental~~ environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>3</sup>

**A249/A249M** Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes

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

<sup>1</sup> 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.

Current edition approved June 1, 2016 April 1, 2021. Published June 2016 April 2021. Originally approved in 1980. Last previous edition approved in 2016 as B674 – 05 (2011) (2016). DOI: 10.1520/B0674-05R16-10.1520/B0674-21.

<sup>2</sup> New designation established in accordance with Practice E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

<sup>3</sup> 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.

\*A Summary of Changes section appears at the end of this standard

**E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)**

**3. Ordering Information**

3.1 Orders for material to this specification should include the following information:

- 3.1.1 Quantity (feet or number of lengths),
- 3.1.2 UNS number,
- 3.1.3 Size (outside diameter, minimum or average wall thickness),
- 3.1.4 Length (random or specific),
- 3.1.5 Class, and
- 3.1.6 ASTM designation.
- 3.1.7 *Product Analysis*—State if required.
- 3.1.8 *Certification*—State if a certification or a report of test results is required.
- 3.1.9 *Purchaser Inspection*—State which tests or inspections are to be witnessed, if any (see **Tables 1 and 2**).

**4. Materials and Manufacture**

4.1 Tube shall be made from flat-rolled alloy by an automatic welding process with no addition or filler metal. Subsequent to welding and prior to final annealing, the material shall be cold-worked in either the weld metal only or both weld and base metal.

NOTE 1—The recommended heat treatment shall consist of heating to a temperature of 1975 to 2150°F (1080 to 1180°C) for UNS N08354 or 2010 to 2100°F (1100 to 1150°C) for UNS N08925 and UNS N08926, followed by quenching in water or rapid cooling by other means.

4.2 Tube shall be furnished with oxide removed. When bright annealing is used, descaling is not necessary.

**5. Chemical Composition**

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

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

**TABLE 1 Chemical Requirements**

| Element         | UNS N08925   | UNS N08354   | UNS N08926     |
|-----------------|--------------|--------------|----------------|
| Carbon, max     | 0.020        | 0.030        | 0.020          |
| Manganese, max  | 1.00         | 1.00         | 2.00           |
| Phosphorus, max | 0.045        | 0.030        | 0.03           |
| Sulfur, max     | 0.030        | 0.010        | 0.01           |
| Silicon, max    | 0.50         | 1.00         | 0.5            |
| Nickel          | 24.0 to 26.0 | 34.0 to 36.0 | 24.00 to 26.00 |
| Chromium        | 19.0 to 21.0 | 22.0 to 24.0 | 19.00 to 21.00 |
| Molybdenum      | 6.0 to 7.0   | 7.0 to 8.0   | 6.0 to 7.0     |
| Copper          | 0.8 to 1.5   | ...          | 0.5 to 1.5     |
| Nitrogen        | 0.1 to 0.2   | 0.17 to 0.24 | 0.15 to 0.25   |
| Iron            | balance      | balance      | balance        |

**TABLE 2 Mechanical Properties**

| Alloy      | Temper            | Tensile Strength, min,<br>psi (MPa) | Yield Strength, 0.2 %<br>offset, min, psi (MPa) | Elongation in 2 in. or<br>50 mm (or 4D), min, % |
|------------|-------------------|-------------------------------------|---|---|
| UNS N08925 | solution annealed | 87 (600)                            | 43 (295)  | 40  |
| UNS N08354 | solution annealed | 93 (640)                            | 43 (295)  | 40  |
| UNS N08926 | solution annealed | 94 (650)                            | 43 (295)  | 35  |

## 6. Mechanical and Other Properties

6.1 *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**.

6.2 *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.

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

6.4 *Nondestructive Test Requirements:*

6.4.1 *Class 1*—Each piece in each lot shall be subject to one of the following four tests: hydrostatic, pneumatic (air underwater), eddy current, or ultrasonic.

6.4.2 *Class 2*—Each piece in each lot shall be subjected to a leak test and an electric test as follows:

6.4.2.1 *Leak Test*—Hydrostatic or pneumatic (air underwater).

6.4.2.2 *Electric Test*—Eddy current or ultrasonic.

<https://standards.iteh.ai/catalog/standards/sist/9b471220-b2c9-42e5-a2bb-8ee4ed02ea05/astm-b674-21>

6.5 The manufacturer shall have the option to test to Class 1 or 2 and select the nondestructive test methods, if not specified by the purchaser.

## 7. General Requirements

7.1 Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification **B751** unless otherwise provided herein.

## 8. Keywords

8.1 UNS ~~N08925~~;N08354; UNS ~~N08354~~;N08925; UNS N08926; welded tube

### SUMMARY OF CHANGES

Committee B02 has identified the location of selected changes to this standard since the last issue (B674 – 05 (2016)) that may impact the use of this standard. (Approved April 1, 2021.)

(1) Removed UNS numbers in title and added alloy descriptors.