



Standard Specification for Seamless Cold-Drawn Carbon Steel Feedwater Heater Tubes¹

This standard is issued under the fixed designation A 556/A 556M; 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 specification² covers minimum-wall-thickness, seamless cold-drawn carbon steel tubes including bending into the form of U-tubes, if specified, for use in tubular feedwater heaters.

1.2 The tubing sizes covered shall be 5/8 to 1¼-in. [15.9 to 31.8-mm] outside diameter, inclusive, with minimum wall thicknesses equal to or greater than 0.045 in. [1.1 mm].

1.3 Optional supplementary requirements are provided, and when desired, shall be stated in the order.

1.4 The values stated in either inch-pound units or SI units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. The inch-pound units shall apply unless the “M” designation of this specification is specified in the order.

2. Referenced Documents

2.1 ASTM Standards:

A 450/A 450M Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes³

E 30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron⁴

3. Ordering Information

3.1 Orders for material under this specification should include the following as required to describe the desired material adequately:

- 3.1.1 Quantity (feet, metres, or number of pieces),
- 3.1.2 Name of material (seamless steel tubing),
- 3.1.3 Dimensions (outside diameter and minimum wall thickness),
- 3.1.4 Length (specific or random),
- 3.1.5 Manufacture (cold drawn),

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys, and is the direct responsibility of Subcommittee A01.09 on Carbon Steel Tubular Products.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-556 in Section II of that Code.

³ *Annual Book of ASTM Standards*, Vol 01.01.

⁴ *Annual Book of ASTM Standards*, Vol 03.05.

3.1.6 Grade (chemical composition),

3.1.7 Optional requirements,

3.1.8 *Bending Requirements*— If order specifies tubes to be bent, the design of the U-tubes shall accompany the order. Purchaser must specify if stress-relief anneal of the U-bends is required,

3.1.9 Test report required (see Certification Section of Specification A 450/A 450M),

3.1.10 Specification number, and

3.1.11 Special requirements and any supplementary requirements selected.

4. General Requirements

4.1 Material furnished to this specification shall conform to the applicable requirements of the current edition of the Specification A 450/A 450M, unless otherwise provided herein.

5. Manufacture

5.1 *Manufacture*—Tubes shall be made by the seamless process and shall be cold drawn.

5.2 Heat Treatment:

5.2.1 Cold-drawn tubes shall be heat treated after the final cold-draw pass at a temperature of 1200°F [640°C] or higher to ensure ductility satisfactory for rolling into tube sheets and to meet mechanical properties as specified.

5.2.2 If stress-relief anneal of the U-bends is specified, the anneal shall consist of heating the bent portion within a range of 1100 to 1200°F [585 to 640°C].

6. Chemical Composition

6.1 The steel shall conform to one of the requirements as to chemical composition as prescribed in Table 1.

6.2 When a grade is ordered under this specification, supplying an alloy grade that specifically requires the addition of any element other than those listed for the ordered grade in Table 1 is not permitted.

7. Product Analysis

7.1 When requested in the purchase order, a product analysis shall be made by the manufacturer or supplier from one tube or billet per heat.

7.2 If the original test for product analysis fails, retests of two additional tubes or billets shall be made. Both retests for the elements in question shall meet the requirements of this