



Standard Specification for Electric-Resistance-Welded Carbon Steel Heat-Exchanger and Condenser Tubes¹

This standard is issued under the fixed designation A 214/A 214M; 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, electric-resistance-welded, carbon steel tubes to be used for heat exchangers, condensers, and similar heat-transfer apparatus.

1.2 The tubing sizes usually furnished to this specification are to 3 in. [76.2 mm] in outside diameter, inclusive. Tubing having other dimensions may be furnished, provided such tubes comply with all other requirements of this specification.

1.3 Mechanical property requirements do not apply to tubing smaller than 1/8 in. [3.2 mm] in inside diameter or 0.015 in. [0.4 mm] in thickness.

1.4 The purchaser shall specify in the order the outside diameter and minimum wall thickness. The inside diameter shall not be specified.

1.5 The values stated in either inch-pound units or SI units are to be regarded separately as 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

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 lengths),
- 3.1.2 Name of material (electric-resistance-welded tubes),
- 3.1.3 Size (outside diameter and minimum wall thickness),

- 3.1.4 Length (specific or random),
- 3.1.5 Optional requirements (Section 8 and 10.5),
- 3.1.6 Test report required (see Certification Section of Specification A 450/A 450M),
- 3.1.7 Specification designation, and
- 3.1.8 Special requirements.

4. General Requirements

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

5. Manufacture

5.1 Tubes shall be made by electric-resistance welding.

6. Heat Treatment

6.1 After welding, all tubes shall be heat treated at a temperature of 1650°F [900°C] or higher and followed by cooling in air or in the cooling chamber of a controlled atmosphere furnace. Cold drawn tubes shall be heat treated after the final cold-draw pass at a temperature of 1200°F [650°C] or higher.

7. Chemical Composition

7.1 The steel shall conform to the following requirements as to chemical composition:

Carbon, max %	0.18
Manganese, %	0.27 to 0.63
Phosphorus, max, %	0.035
Sulfur, max, %	0.035

7.2 Supplying an alloy grade of steel that specifically requires the addition of any element other than those listed in 8.1 is not permitted.

8. Product Analysis

8.1 When requested on the purchase order, a product analysis shall be made by the supplier from one tube per 250 pieces; or when tubes are identified by heat, one tube per heat shall be analyzed. The chemical composition thus determined shall conform to the requirements specified.

8.2 If the original test for product analysis fails, retests of two additional lengths of flat-rolled stock, or tubes shall be made. Both retests, for the elements in question, shall meet the

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-214 in Section II of that Code.

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