



Designation: ~~A210/A210M – 02 (Reapproved 2012)~~ A210/A210M – 19

Standard Specification for Seamless Medium-Carbon Steel Boiler and Superheater Tubes¹

This standard is issued under the fixed designation A210/A210M; 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~~ Scope*

1.1 This specification² covers minimum-wall-thickness, seamless medium-carbon steel, boiler tubes and boiler flues, including safe ends (see [Note 1](#)), arch and stay tubes, and superheater tubes.

NOTE 1—This type is not suitable for safe ending by forge welding.

1.2 The tubing sizes and thicknesses usually furnished to this specification are ½ in. to 5 in. [12.7 to 127 mm] in outside diameter and 0.035 to 0.500 in. [0.9 to 12.7 mm], inclusive, in minimum wall thickness. 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 ⅛ in. [3.2 mm] in inside diameter or 0.015 in. [0.4 mm] in thickness.

1.4 This specification covers grades A-1 and C of Seamless Medium-Carbon Boiler and Superheater Tubes with different chemical and tensile requirements. ([Table 1](#), [Table 3](#), and [Section 11](#).)

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.

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:~~³ [ASTM A210/A210M-19](#)
[A450/A450M Specification for General Requirements for Carbon and Low Alloy Steel Tubes](#)

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 (seamless tubes),
- 3.1.3 Grade,
- 3.1.4 Manufacture (hot-finished or cold-finished),
- 3.1.5 Size (outside diameter and minimum wall thickness),
- 3.1.6 Length (specific or random),
- 3.1.7 Optional requirements ([Sections 7](#) and [10](#)),
- 3.1.8 Test report required, (see Certification Section of Specification [A450/A450M](#)),

¹ This specification is under the jurisdiction of ASTM Committee [A01](#) 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-210 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.

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



TABLE 3 Tensile Requirements

	Grade A-1	Grade C
Tensile strength, min, ksi [MPa]	60 [415]	70 [485]
Yield strength, min, ksi [MPa]	37 [255]	40 [275]
Elongation in 2 in. or 50 mm, min, %	30	30
For longitudinal strip tests, a deduction shall be made for each 1/32-in. [0.8-mm] decrease in wall thickness under 5/16 in. [8 mm] from the basic minimum elongation of the following percentage points	1.50 ^A	1.50 ^A
When standard round 2-in. or 50-mm gage length or smaller proportionally sized specimen with the gage length equal to 4D (four times the diameter) is used	22	20

^A See Table 4 for the computed minimum values.

- 3.1.9 Specification designation, and
- 3.1.10 Special requirements.

4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification A450/A450M, unless otherwise provided herein.

5. Manufacture

- 5.1 *Steelmaking Practice*—The steel shall be killed.
- 5.2 The tubes shall be made by the seamless process and shall be either hot-finished or cold-finished, as specified.

6. Heat Treatment

6.1 Hot-finished tubes need not be heat treated. Cold-finished tubes shall be given a subcritical anneal, a full anneal, or a normalizing heat treatment after the final cold finishing process.

7. Surface Condition

- 7.1 If pickling or shot blasting or both are required, this shall be specifically stated in the order.

8. Chemical Composition

- 8.1 The steel shall conform to the requirements as to chemical composition prescribed in Table 1.
- 8.2 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.

9. Product Analysis

- 9.1 When requested on the purchase order, a product analysis shall be made by the supplier from one tube or billet per heat. The chemical composition thus determined shall conform to the requirements specified.
- 9.2 If the original test for product analysis fails, retests of two additional billets or tubes shall be made. Both retests for the elements in question shall meet the requirements of the specification; otherwise, all remaining material in the heat or lot (see Note 2) shall be rejected or, at the option of the producer, each billet or tube may be individually tested for acceptance. Billets or tubes which do not meet the requirements of the specification shall be rejected.

NOTE 2—For flattening and flaring requirements, the term “lot” applies to all tubes prior to cutting of the same nominal size and wall thickness which

TABLE 1 Chemical Requirements

Element	Composition, %	
	Grade A-1	Grade C
Carbon ^A , max	0.27	0.35
Manganese	0.93 max	0.29–1.06
Phosphorus, max	0.035	0.035
Sulfur, max	0.035	0.035
Silicon, min	0.10	0.10

^A For each reduction of 0.01 % below the specified carbon maximum, an increase of 0.06 % manganese above the specified maximum will be permitted up to a maximum of 1.35 %.