



Designation: A672/A672M – 19 (Reapproved 2025)

# Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures<sup>1</sup>

This standard is issued under the fixed designation A672/A672M; 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<sup>2</sup> covers steel pipe: electric-fusion-welded with filler metal added, fabricated from pressure-vessel quality plate of any of several analyses and strength levels and suitable for high-pressure service at moderate temperatures. Heat treatment may or may not be required to attain the desired properties or to comply with applicable code requirements. Supplementary requirements are provided for use when additional testing or examination is desired.

1.2 The specification nominally covers pipe 16 in. [400 mm] in outside diameter or larger with wall thicknesses up to 3 in. [75 mm], inclusive. Pipe having other dimensions may be furnished provided it complies with all other requirements of this specification.

1.3 Several grades and classes of pipe are provided.

1.3.1 *Grade* designates the type of plate used.

1.3.2 *Class* designates the type of heat treatment performed during manufacture of the pipe, whether the weld is radiographically examined, and whether the pipe has been pressure tested as listed in 1.3.3.

1.3.3 Class designations are as follows (Note 1):

| Class | Heat Treatment on Pipe             | Radiography, see Section | Pressure Test, see Section |
|-------|------------------------------------|--------------------------|----------------------------|
| 10    | none                               | none                     | none                       |
| 11    | none                               | 9                        | none                       |
| 12    | none                               | 9                        | 8.3                        |
| 13    | none                               | none                     | 8.3                        |
| 20    | stress relieved, see 5.3.1         | none                     | none                       |
| 21    | stress relieved, see 5.3.1         | 9                        | none                       |
| 22    | stress relieved, see 5.3.1         | 9                        | 8.3                        |
| 23    | stress relieved, see 5.3.1         | none                     | 8.3                        |
| 30    | normalized, see 5.3.2              | none                     | none                       |
| 31    | normalized, see 5.3.2              | 9                        | none                       |
| 32    | normalized, see 5.3.2              | 9                        | 8.3                        |
| 33    | normalized, see 5.3.2              | none                     | 8.3                        |
| 40    | normalized and tempered, see 5.3.3 | none                     | none                       |

<sup>1</sup> 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.

Current edition approved Sept. 1, 2025. Published September 2025. Originally approved in 1972. Last previous edition approved in 2019 as A672/A672M – 19. DOI: 10.1520/A0672\_A0672M-19R25.

<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications see related Specification SA-672 in Section II of that Code.

|    |                                    |      |      |
|----|------------------------------------|------|------|
| 41 | normalized and tempered, see 5.3.3 | 9    | none |
| 42 | normalized and tempered, see 5.3.3 | 9    | 8.3  |
| 43 | normalized and tempered, see 5.3.3 | none | 8.3  |
| 50 | quenched and tempered, see 5.3.4   | none | none |
| 51 | quenched and tempered, see 5.3.4   | 9    | none |
| 52 | quenched and tempered, see 5.3.4   | 9    | 8.3  |
| 53 | quenched and tempered, see 5.3.4   | none | 8.3  |

NOTE 1—Selection of materials should be made with attention to temperature of service. For such guidance, Specification A20/A20M may be consulted.

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

1.5 *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>

- A20/A20M Specification for General Requirements for Steel Plates for Pressure Vessels
- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A435/A435M Specification for Straight-Beam Ultrasonic Examination of Steel Plates
- A530/A530M Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
- A577/A577M Specification for Ultrasonic Angle-Beam Examination of Steel Plates
- A578/A578M Specification for Straight-Beam Ultrasonic

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

Examination of Rolled Steel Plates for Special Applications

**E109** Method for Dry Powder Magnetic Particle Inspection; Replaced by E 709 (Withdrawn 1981)<sup>4</sup>

**E138** Method for Wet Magnetic Particle Inspection; Replaced by E 709 (Withdrawn 1981)<sup>4</sup>

**E110** Test Method for Rockwell and Brinell Hardness of Metallic Materials by Portable Hardness Testers

**E165** Practice for Liquid Penetrant Testing for General Industry

**E709** Guide for Magnetic Particle Testing

2.1.1 *Plate Steel Specifications* (**Table 1**)

**A204/A204M** Specification for Pressure Vessel Plates, Alloy Steel, Molybdenum

**A285/A285M** Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength

**A299/A299M** Specification for Pressure Vessel Plates, Carbon Steel, Manganese-Silicon

**A302/A302M** Specification for Pressure Vessel Plates, Alloy Steel, Manganese-Molybdenum and Manganese-Molybdenum-Nickel

**A515/A515M** Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service

**A516/A516M** Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service

**A533/A533M** Specification for Pressure Vessel Plates, Alloy Steel, Quenched and Tempered, Manganese-Molybdenum and Manganese-Molybdenum-Nickel

**A537/A537M** Specification for Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel

2.2 *ASME Boiler and Pressure Vessel Code*:<sup>5</sup>

Section II

Section III

Section VIII

Section IX

### 3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 A *lot* shall consist of 200 ft [60 m] or fraction thereof of pipe from the same heat of steel.

3.1.2 The description of a lot may be further restricted by use of Supplementary Requirement S14.

### 4. Ordering Information

4.1 The inquiry and order for material under this specification should include the following information:

4.1.1 Quantity (feet, metres, or number of lengths),

4.1.2 Name of material (steel pipe, electric-fusionwelded),

4.1.3 Specification number,

4.1.4 Grade and class designations (see **1.3**),

4.1.5 Size (inside or outside diameter, nominal or minimum wall thickness),

4.1.6 Length (specific or random),

4.1.7 End finish (**11.4**),

4.1.8 Purchase options, if any (see **5.2.3**, **11.3**, 14.1 and Sections 16, 20.1, 21, 22 of Specification **A530/A530M**), and

4.1.9 Supplementary requirements, if any (refer to S1 through S15).

### 5. Materials and Manufacture

5.1 *Materials*—The steel plate material shall conform to the requirements of the applicable plate specification for pipe grade ordered as listed in **Table 1**.

5.2 *Welding*:

5.2.1 The joints shall be double-welded, full-penetration welds made in accordance with procedures and by welders or welding operators qualified in accordance with the ASME Boiler and Pressure Vessel Code, Section IX.

5.2.2 The welds shall be made either manually or automatically by an electric process involving the deposition of filler metal.

5.2.3 The welded joint shall have positive reinforcement at the center of each side of the weld, but not more than 1/8 in. [3 mm]. This reinforcement may be removed at the manufacturer's option or by agreement between the manufacturer and purchaser. The contour of the reinforcement shall be smooth, and the deposited metal shall be fused smoothly and uniformly into the plate surface.

5.2.4 When radiographic examination in accordance with **9.1** is to be used, the weld reinforcement shall be governed by the more restrictive provisions of UW-51 of Section VIII of the ASME Boiler and Pressure Vessel Code instead of **5.2.3** of this specification.

5.3 *Heat Treatment*—All classes other than 10, 11, 12 and 13 shall be heat treated in furnace controlled to  $\pm 25$  °F [15 °C] and equipped with a recording pyrometer so that heating records are available. Heat treating after forming and welding shall be to one of the following:

5.3.1 Classes 20, 21, 22, and 23 pipe shall be uniformly heated within the post-weld heat-treatment temperature range indicated in **Table 2** for a minimum of 1 h/in. [0.4 hr/cm] of thickness or 1 h, whichever is greater.

5.3.2 Classes 30, 31, 32, and 33 pipe shall be uniformly heated to a temperature in the austenitizing range and not exceeding the maximum normalizing temperature indicated in **Table 2** and subsequently cooled in air at room temperature.

5.3.3 Classes 40, 41, 42, and 43 pipe shall be normalized in accordance with **5.3.2**. After normalizing, the pipe shall be reheated to the tempering temperature indicated in **Table 2** as a minimum and held at temperature for a minimum of 1/2 h/in. [0.2 hr/cm] of thickness or 1/2 h, whichever is greater, and air cooled.

5.3.4 Classes 50, 51, 52, and 53 pipe shall be uniformly heated to a temperature in the austenitizing range, and not exceeding the maximum quenching temperature indicated in **Table 2** and subsequently quenched in water or oil. After quenching the pipe shall be reheated to the tempering temperature indicated in **Table 2** as a minimum and held at temperature for a minimum of 1/2 h/in. [0.2 hr/cm] of thickness or 1/2 h, whichever is greater, and air cooled.

<sup>4</sup>The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

<sup>5</sup>Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.