



Designation: A671/A671M – 20 (Reapproved 2025)

Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures¹

This standard is issued under the fixed designation A671/A671M; 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 electric-fusion-welded steel pipe with filler metal added, fabricated from pressure vessel quality plate of several analyses and strength levels and suitable for high-pressure service at atmospheric and lower 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 and of ¼ in. [6 mm] wall thickness or greater. 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 as listed in 5.1.

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:
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

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-671 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
70	quenched and precipitation heat treated	none	none
71	quenched and precipitation heat treated	9	none
72	quenched and precipitation heat treated	9	8.3
73	quenched and precipitation heat treated	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:³

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

³ 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.

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 Examination of Rolled Steel Plates for Special Applications
E110 Test Method for Rockwell and Brinell Hardness of Metallic Materials by Portable Hardness Testers
E165/E165M Practice for Liquid Penetrant Testing for General Industry
E709 Guide for Magnetic Particle Testing

2.2 Plate Steels:

A203/A203M Specification for Pressure Vessel Plates, Alloy Steel, Nickel
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
A353/A353M Specification for Pressure Vessel Plates, Alloy Steel, Double-Normalized and Tempered 9 % 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
A517/A517M Specification for Pressure Vessel Plates, Alloy Steel, High-Strength, Quenched and Tempered
A537/A537M Specification for Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel
A553/A553M Specification for Pressure Vessel Plates, Alloy Steel, Quenched and Tempered 7 %, 8 %, and 9 % Nickel
A736/A736M Specification for Pressure Vessel Plates, Low-Carbon Age-Hardening Nickel-Copper-Chromium-Molybdenum-Columbium (Niobium) Alloy Steel

2.3 ASME Boiler and Pressure Vessel Code:⁴

Section II
Section III
Section VIII
Section IX

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

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

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 and 11.3 of this specification. See also Specification **A530/A530M**),

4.1.9 Supplementary requirements, if any.

5. Materials and Manufacture

5.1 *Materials*—The steel plate material shall conform to the requirement of the applicable plate specification for the 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 As welded, the welded joint shall have positive reinforcement at the center of each side of the weld, but no 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.

5.3 *Heat Treatment*—All classes other than 10, 11, 12, and 13 shall be heat treated in furnace controlled to $\pm 25^\circ\text{F}$ [$\pm 15^\circ\text{C}$] 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:

TABLE 1 Plate Specifications

Pipe Grade	Type of Steel	ASTM Specification	
		No.	Grade / Class / Type
CA 55	plain carbon	A285/A285M	Gr C
CB 60	plain carbon, killed	A515/A515M	Gr 60
CB 65	plain carbon, killed	A515/A515M	Gr 65
CB 70	plain carbon, killed	A515/A515M	Gr 70
CC 60	plain carbon, killed, fine grain	A516/A516M	Gr 60
CC 65	plain carbon, killed, fine grain	A516/A516M	Gr 65
CC 70	plain carbon, killed, fine grain	A516/A516M	Gr 70
CD 70	manganese-silicon, normalized	A537/A537M	Cl 1
CD 80	manganese-silicon, quenched and tempered	A537/A537M	Cl 2
CFA 65	nickel steel	A203/A203M	Gr A
CFB 70	nickel steel	A203/A203M	Gr B
CFD 65	nickel steel	A203/A203M	Gr D
CFE 70	nickel steel	A203/A203M	Gr E
CG 100	9 % nickel	A353/A353M	
CH 115	9 % nickel	A553/A553M	Type 1
CJA 115	alloy steel, quenched and tempered	A517/A517M	Gr A
CJB 115	alloy steel, quenched and tempered	A517/A517M	Gr B
CJE 115	alloy steel, quenched and tempered	A517/A517M	Gr E
CJF 115	alloy steel, quenched and tempered	A517/A517M	Gr F
CJH 115	alloy steel, quenched and tempered	A517/A517M	Gr H
CJP 115	alloy steel, quenched and tempered	A517/A517M	Gr P
CK 75	carbon-manganese-silicon	A299/A299M	Gr A
CP85	alloy steel, age hardening, quenched and precipitation heat treated	A736/A736M	Gr A, Class 3

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.