



Designation: A135/A135M – 19

## Standard Specification for Electric-Resistance-Welded Steel Pipe<sup>1</sup>

This standard is issued under the fixed designation A135/A135M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This specification<sup>2</sup> covers two grades of electric-resistance-welded steel pipe in NPS 2 to NPS 30 [DN 50 to DN 750] inclusive, with nominal (average) wall thickness up to 0.500 in. [12.70 mm], inclusive, and in nominal sizes NPS  $\frac{3}{4}$  to NPS 5 [DN 20 to DN 125] inclusive with nominal (average) wall thickness 0.083 in. [2.11 mm] to 0.134 in. [3.40 mm], depending on size. Pipe having other dimensions (**Note 1**) may be furnished provided such pipe complies with all other requirements of this specification. The pipe is intended for conveying gas, vapor, water or other liquid; only Grade A is adapted for flanging and bending (**Note 2**). The suitability of pipe for various purposes is somewhat dependent upon its dimensions, properties, and conditions of service, so that the purpose for which the pipe is intended should be stated in the order. The pipe may be furnished either nonexpanded or cold expanded at the option of the manufacturer. When pipe is cold expanded, the amount of expansion shall not exceed 1.5 % of the outside diameter pipe size.

NOTE 1—A comprehensive listing of standardized pipe dimensions is contained in ASME B36.10M.

NOTE 2—This provision is not intended to prohibit the cold bending of Grade B pipe.

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

1.3 *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.*

<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.

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<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-135 in Section II of that Code.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>3</sup>

- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A700 Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
- A865/A865M Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
- A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
- E6 Terminology Relating to Methods of Mechanical Testing
- E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- E213 Practice for Ultrasonic Testing of Metal Pipe and Tubing
- E273 Practice for Ultrasonic Testing of the Weld Zone of Welded Pipe and Tubing
- E309 Practice for Eddy Current Examination of Steel Tubular Products Using Magnetic Saturation
- E570 Practice for Flux Leakage Examination of Ferromagnetic Steel Tubular Products
- E1806 Practice for Sampling Steel and Iron for Determination of Chemical Composition

#### 2.2 ASME Standard:

- B1.20.1 Pipe Threads, General Purpose<sup>4</sup>
- B36.10M Welded and Seamless Wrought Steel Pipe<sup>4,5</sup>

#### 2.3 Federal Standards:

- Fed. STD No. 123 Marking for Shipments (Civil Agencies)<sup>6</sup>
- Fed. STD No. 183 Continuous Identification Marking of Iron and Steel Products<sup>6</sup>

<sup>3</sup> 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.

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.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.

<sup>6</sup> Available from General Service Administration, Washington, DC 20405.

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

2.4 *Military Standards:*MIL-STD-129 Marking for Shipment and Storage<sup>7</sup>

## 3. Terminology

3.1 For definitions of terms relating to steel manufacturing and properties, refer to Terminology A941.

3.2 For definitions of terms relating to mechanical testing, refer to Terminology E6.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *burr, n*—a rough or sharp edge left on pipe ends by cutting or sawing.

3.3.2 *lot, n*—all pipe of the same size, wall thickness and rolled length that is produced from the same heat of steel and subject to the same heat treatment.

3.3.3 *black thread, n*—a thread crease exhibiting the original pipe surface after machining.

## 4. Ordering Information

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

- 4.1.1 Quantity (feet, metres, or number of lengths),
- 4.1.2 Name of product (electric-resistance-welded pipe),
- 4.1.3 Specification designation and year of issue,
- 4.1.4 Grade (see Table 1),
- 4.1.5 Size (nominal size, NPS [DN], or outside diameter; and nominal wall thickness),
- 4.1.6 Length (specific or random, see 12.4),
- 4.1.7 End finish (plain or threaded, see 13.2),
- 4.1.7.1 Threaded and coupled, if specified,

4.1.7.2 Threads only, if specified,

4.1.7.3 Plain end, if specified,

4.1.8 Alternative electric test (see Section 11),

4.1.9 Tension test specimen (see Section 15),

4.1.10 Heat analysis, if required (see 6.1),

4.1.11 Certificate of compliance, if required (see Section 19), and

4.1.12 Special requirements.

## 5. Manufacture

5.1 The steel shall be made by either or both of the following processes: basic-oxygen or electric-furnace.

5.2 Steel may be cast in ingots or may be strand cast. When steels of different grades are sequentially strand cast, identification of the resultant transition material is required. The producer shall remove the transition material by any established procedure that positively separates the grades.

5.3 The pipe shall be manufactured from flat rolled steel in individual lengths or in continuous length by electric-resistance or electric-induction welding without the addition of extraneous material.

5.4 The weld seam of electric-resistance welded pipe to Grade B pipe shall be heat treated after welding to a minimum temperature of 1000 °F [540 °C] or processed in such a manner that no untempered martensite remains.

## 6. Chemical Composition

6.1 The steel shall conform to the requirements prescribed in Table 2, based on the heat analysis. When specified in the order, the heat analyses shall be reported to the purchaser or a representative of the purchaser.

<sup>7</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111–5094. Attn.: NOPD.

TABLE 1 Tensile Requirements

	Grade A	Grade B
Tensile strength, min, ksi [MPa]	48 [330]	60 [415]
Yield strength, min, ksi [MPa]	30 [205]	35 [240]
Elongation in 2 in. or [50 mm], min, %:		
For pipe having a specified wall thickness of $\frac{5}{16}$ in. [7.9 mm] or more, if tested using a longitudinal strip test specimen.	35	30
For pipe having a specified wall thickness of less than $\frac{5}{16}$ in. [7.9 mm], if tested using a longitudinal strip test specimen.	A	B
For pipe of any size, if tested using a full-size longitudinal test specimen.	35	30

<sup>A</sup> The minimum elongation shall be determined by the following equation, with the calculated value rounded to the nearest percent:

$$E = 56t + 16.5$$

$$[E = 2.2t + 16.5]$$

where:

$E$  = elongation in 2 in. or [50 mm], minimum, %, and  
 $t$  = specified wall thickness, in. [mm].

<sup>B</sup> The minimum elongation shall be determined by the following equation, with the calculated value rounded to the nearest percent:

$$E = 48t + 14$$

$$[E = 1.9t + 14]$$

where:

$E$  = elongation in 2 in. or [50 mm], minimum, %, and  
 $t$  = specified wall thickness, in. [mm].