



Standard Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines¹

This standard is issued under the fixed designation A 539; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers one grade of electric-resistance-welded coiled steel tubing 2 $\frac{3}{8}$ in. (60.3 mm) and under in outside diameter and 0.035 to 0.125 in. (0.9 to 3.2 mm), inclusive, in nominal wall thickness. The tubing is intended for conveyance of gas and fuel oil.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI values given are for information only.

2. Referenced Documents

2.1 ASTM Standards:

A 450/A 450M Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes²

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products³

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys²

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology A 941.

4. Ordering Information

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

4.1.1 Quantity (number of feet),

4.1.2 Name of material (electric-resistance-welded tubing),

4.1.3 Tubing size (outside diameter and nominal wall thickness),

4.1.4 Product analysis (see 7.1),

4.1.5 Specification designation and year of issue,

4.1.6 End use of material,

4.1.7 Test pressure, if higher than minimum specified (see 12.4), and

4.1.8 Bar coding (see 13.2).

5. General Requirements for Delivery

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

6. Chemical Composition

6.1 The steel shall conform to the requirements prescribed in Table 1. Methods and practices relating to chemical analysis shall be in accordance with Test Methods, Practices, and Terminology A 751.

6.2 Supplying an alloy grade of steel that specifically requires the addition of any element other than those listed in Table 1 is not permitted.

7. Product Analysis

7.1 When specified in the purchase order, the manufacturer shall determine the product analysis using a test specimen taken from one coil in each lot of 250 coils or fraction thereof of the same size of tubing produced from the same heat of steel. Such product analyses shall conform to the requirements prescribed in Table 1.

7.2 If the original product analysis representing a lot fails to conform to the specified requirements, product analyses for the elements that failed to conform shall be made using test specimens taken from two additional coils in the lot. If either retest fails to conform to the specified requirements, the lot shall be rejected or the remaining coils in the lot shall be tested individually, with any nonconforming coils being rejected.

8. Tensile Requirements

8.1 The tubing shall conform to the requirements as to tensile properties prescribed in Table 2.

¹ This specification is under the jurisdiction of ASTM Committee A-1 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 *Annual Book of ASTM Standards*, Vol 01.01.

³ *Annual Book of ASTM Standards*, Vol 01.03.

TABLE 1 Chemical Requirements

Element	Composition, %, max
Carbon	0.15
Manganese	0.63
Phosphorus	0.035
Sulfur	0.035

TABLE 2 Tensile Requirements

Tensile strength, min, ksi (MPa)	45 (310)
Yield strength, min, ksi (MPa)	35 (241)
Elongation in 2 in. or 50 mm, min, %	^A

^AThe minimum elongation in 2 in. or 50 mm shall be that determined by the following equation:

$$E = 48t + 15$$

where:

E = minimum elongation in 2 in. or 50 mm, %, rounded to the nearest percent, and

t = specified wall thickness, in.

9. Height of Flash

9.1 The inside welding flash need not be removed. The height of flash shall not exceed the specified wall thickness or $\frac{3}{32}$ in. (2.4 mm), whichever is smaller.

10. Dimensions and Permissible Variations

10.1 The outside diameter shall not vary more than ± 0.007 in. (± 0.2 mm) from the specified outside diameter.

10.2 The minimum wall thickness at any point shall be not more than 10 % under the specified wall thickness.

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11. Workmanship, Finish, and Appearance

11.1 Tubing shall be free of imperfections in excess of 10 % of the specified wall thickness and shall have a workmanlike finish.

12. Number of Tests

12.1 One longitudinal tension test shall be made using a test specimen taken from one coil in each lot of 250 coils or fraction thereof of the same size of tubing.

12.2 A flattening test shall be made on both crop ends cut from each coil of tubing, with the weld located alternately at 0° and 90° from the line of direction of force.

12.3 Each tube shall be tested by the nondestructive electric method.

12.4 Each coil of tubing shall be pressure tested at the mill at a gage pressure level of at least 150 psi (1000 kPa) for a minimum of 10 S.

13. Product Marking

13.1 In addition to the marking specified in Specification A 450/A 450M, the marking shall include the test pressure, when that pressure is higher than the minimum specified in 12.4. The marking shall be legibly stenciled on a tag securely attached to each coil.

13.2 In addition to the requirements in 13.1, bar coding is acceptable as a supplemental identification method. The purchaser may specify in the order a specific bar coding system to be used.

14. Keywords

14.1 resistance welded steel tube; steel tube; carbon; welded steel tube