



Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing¹

This standard is issued under the fixed designation A 618; 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 grades of hot-formed welded and seamless high-strength low-alloy square, rectangular, round, or special shape structural tubing for welded, riveted, or bolted construction of bridges and buildings and for general structural purposes. When the steel is used in welded construction, the welding procedure shall be suitable for the steel and the intended service.

1.2 Grade II has atmospheric corrosion resistance equivalent to that of carbon steel with copper (0.20 minimum Cu). Grades Ia and Ib have atmospheric corrosion resistance substantially better than that of Grade II (Note 1). When properly exposed to the atmosphere, Grades Ia and Ib can be used bare (unpainted) for many applications. When enhanced corrosion resistance is desired, Grade III, copper limits may be specified.

NOTE 1—For methods of estimating the atmospheric corrosion resistance of low alloy steels see Guide G 101 or actual data.

1.3 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment³

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products²

G 101 Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels⁴

3. Ordering Information

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

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 01.03.

³ Annual Book of ASTM Standards, Vol 01.05.

⁴ Annual Book of ASTM Standards, Vol 03.02.

- 3.1.1 Quantity (feet or number of lengths),
- 3.1.2 Grade (Table 1 and Table 2),
- 3.1.3 Material (round, square, or rectangular tubing),
- 3.1.4 Method of manufacture (seamless, butt welded, or hot-stretch-reduced electric-resistance welded),
- 3.1.5 Size (outside diameter and nominal wall thickness for round tubing and the outside dimensions and calculated nominal wall thickness for square and rectangular tubing),
- 3.1.6 Length (specific or random, see 8.2),
- 3.1.7 End condition (see 9.2),
- 3.1.8 Burr removal (see 9.2),
- 3.1.9 Certification (see 12.1),
- 3.1.10 Specification designation,
- 3.1.11 End use, and
- 3.1.12 Special requirements.

4. Process

4.1 The steel shall be made by one or more of the following processes: open-hearth, basic-oxygen, or electric-furnace.

4.2 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. Manufacture

5.1 The tubing shall be made by the seamless, furnace-butt welded (continuous-welded), or hot-stretch-reduced electric-resistance-welded process.

6. Chemical Composition

6.1 When subjected to the heat and product analysis, respectively, the steel shall conform to the requirements prescribed in Table 1.

6.1.1 For Grades Ia and Ib, the choice and use of alloying elements, combined with carbon, manganese, and sulfur within the limits prescribed in Table 1 to give the mechanical properties prescribed in Table 2 and to provide the atmospheric corrosion resistance of 1.2, should be made by the manufacturer and included and reported in the heat analysis for information purposes only to identify the type of steel applied. For Grades Ia and Ib material, the atmospheric corrosion-resistance index, calculated on the basis of the chemical