Designation: A595/A595M – 06

Standard Specification for Steel Tubes, Low-Carbon or High-Strength Low-Alloy, Tapered for Structural Use[1]

This standard is issued under the fixed designation A595/A595M; 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 three grades of seam-welded, round, tapered steel tubes for structural use. Grades A and B are of low-carbon steel or high-strength low-alloy steel composition and Grade C is of weather-resistant steel composition.

1.2 This tubing is produced in welded sizes in a range of diameters from 2 ⅜ to 30 in. [60 to 762 mm] inclusive. Wall thicknesses range from 0.1046 to 0.375 in. [2.66 to 9.53 mm]. Tapers are subject to agreement with the manufacturer.

1.3 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 indepedently of the other. Combining values from the two systems may result in non-conformance with the standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A588/A588M Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance

A606 Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance

A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

G101 Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels

3. Ordering Information

3.1 The inquiry and order should indicate the following:

3.1.1 Large and small diameters (in.) [mm], length (ft) [m], wall thickness (in.) [mm], taper (in./ft) [mm/m];

3.1.2 (see Table 1 and Table 2);

3.1.3 Extra test material requirements, if any; and

3.1.4 Supplementary requirements, if any.

4. General Requirements for Delivery

4.1 Required date of shipment or date of receipt, and

4.2 Special shipping instructions, if any.

5. Manufacture

5.1 Tube steel shall be hot-rolled aluminum-semikilled or fine-grained killed sheet or plate manufactured by one or more of the following processes: open-hearth, basic-oxygen, or electric-furnace.

5.2 Tubes shall be made from trapezoidal sheet or plate that is preformed and then seam welded. Tubes shall be brought to final size and properties by roll compressing cold on a hardened mandrel.

6. Chemical Composition

6.1 Steel shall conform to the requirements for chemical composition given in Tables 1 and 3. Chemical analysis shall be in accordance with Test Methods, Practices, and Terminology A751.

6.2 For Grade C material, the atmospheric corrosion-resistance index, calculated on the basis of the chemical composition of the steel, as described in Guide G101, shall be 6.0 or higher.

[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 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.

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

TABLE 1 Chemical Requirements

Elements	Composition by Heat Analysis, %												
	Grade A				Grade B				Grade C				
	Carbon Steel	HSLA SS	HSLAS Cl1	HSLAS Cl2	Carbon Steel	HSLA SS	HSLAS Cl1	HSLAS Cl2	A 606	A 588/A	A 588/B	A 588/C	A 588/K
Carbon	0.015–0.25	0.25 max	0.23 max	0.15 max	0.015–0.25	0.25 max	0.26 max	0.15 max	0.22 max	0.19 max	0.20 max	0.15 max	0.17 max
Manganese	0.30–0.90	1.35 max	1.35 max	1.35 max	0.40–1.35	1.35 max	1.50 max	1.50 max	1.25 max	0.80–1.25	0.75–1.35	0.80–1.35	0.50–1.20
Phosporous	0.035 max	0.035 max	0.04 max	0.04 max	0.035 max	0.035 max	0.04 max	0.04 max	[A]	0.04 max	0.04 max	0.04 max	0.04 max
Sulfur	0.035 max	0.04 max	0.04 max	0.04 max	0.035 max	0.04 max	0.04 max	0.04 max	0.04 max	0.05 max	0.05 max	0.05 max	0.05 max
Silicon	0.040 max[B]	0.040 max[B]	0.040 max[B]	0.040 max[B]	0.040 max[B]	0.040 max[B]	0.040 max[B]	0.040 max[B]	[A]	0.30–0.65	0.15–0.50	0.15–0.40	0.25–0.50
Copper[C,D]	...	0.20 max	0.20 max	0.20 max	...	0.20 max	0.20 max	0.20 max	[A]	0.25–0.40	0.20–0.40	0.20–0.50	0.30–0.50
Chromium[C,E]	...	0.15 max	0.15 max	0.15 max	...	0.15 max	0.15 max	0.15 max	[A]	0.40–0.65	0.40–0.70	0.30–0.50	0.40–0.70
Nickel[C]	...	0.20 max	0.20 max	0.20 max	...	0.20 max	0.20 max	0.20 max	[A]	0.40 max	0.50 max	0.25–0.50	0.40 max
Molybdenum[C,E]	...	0.06 max	0.06 max	0.06 max	...	0.06 max	0.06 max	0.06 max	...	[A]	[A]	[A]	0.10 max
Vanadium[F]	...	0.008 max	0.01 min	0.01 min	...	0.008 max	0.01 min	0.01 min	...	0.02–0.10	0.01–0.10	0.01–0.10	[A]
Columbium[F]	...	0.008 max	0.005 min	0.005 min	...	0.008 max	0.005 min	0.005 min	...	[A]	[A]	[A]	0.005–0.05
Nitrogen	...	[A]	[A]	[A]	...	[A]	[A]	[A]	...	...	...	...	...
Aluminum[B]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	...	...	...	...	...

[A]There is no limit; however, the analysis shall be reported.

[B]Silicon or silicon in combination with aluminum must be sufficient to ensure uniform mechanical properties. Their sum shall be greater than or equal to 0.020 %.

[C]For HSLA steels the sum of copper, nickel, chromium, and molybdenum shall not exceed 0.50 % on heat analysis. When one of these elements are specified by the purchaser, the sum does not apply, in which case only the individual limits of the remaining elements shall apply.

[D]For HSLA steels when copper is specified, the copper limit is a minimum requirement. When copper steel is not specified, the copper limit is a maximum requirement.

[E]For SS steel the sum of chromium and molybdenum shall not exceed 0.16 % on heat analysis. When one or more of these elements are specified by the purchaser, the sum does not apply, in which case the individual limit on the remaining unspecified element shall apply.

[F]For HSLA steels vanadium and columbium minimums may be satisfied separately or by combining their values, in which event the sum shall exceed the combined minimums.