



Designation: **A749/A749M – 14 (Reapproved 2021)**

Standard Specification for Steel, Strip, Carbon and High-Strength, Low-Alloy, Hot- Rolled, General Requirements for¹

This standard is issued under the fixed designation A749/A749M; 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 U.S. Department of Defense.

1. Scope

1.1 This specification covers the general requirements for hot-rolled steel strip in coils and cut lengths. It applies to carbon steel and high-strength, low-alloy steel furnished as hot-rolled.

1.2 This specification is not applicable to hot-rolled heavy-thickness carbon sheet and strip coils (Specification **A1018/A1018M**), cold-rolled carbon steel strip (Specification **A109/A109M**), high-strength, low-alloy cold-rolled steel (Specifications **A606/A606M** and **A1008/A1008M**) or cold-rolled high carbon steel (Specification **A684/A684M**).

1.3 In case of any conflict in requirements, the requirements of the individual material specification shall prevail over those of this general specification.

1.4 For the purposes of determining conformance with this and the appropriate product specification referenced under **2.1**, values shall be rounded to the nearest unit in the right hand place of figures used in expressing the limiting values in accordance with the rounding method of Practice **E29**.

1.5 **Annex A1** lists permissible variations in dimensions and mass (**Note 1**) in SI [metric] units. The values listed are not exact conversions of the values listed in the inch-pound tables, but instead are rounded or rationalized values. Conformance to **Annex A1** is mandatory when the “M” specification is used.

NOTE 1—The term “weight” is used when inch-pound units are the standard; however, under SI, the preferred term is “mass.”

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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 **A01.19** on Steel Sheet and Strip.

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1.7 This specification and the applicable material specifications are expressed in both inch-pound units and SI units. However, unless the order specifies the applicable “M” specification designation (SI units), the material shall be furnished to inch-pound units.

1.8 *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:²

- A109/A109M** Specification for Steel, Strip, Carbon (0.25 Maximum Percent), Cold-Rolled
- A370** Test Methods and Definitions for Mechanical Testing of Steel Products
- A568/A568M** Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
- A606/A606M** Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
- A684/A684M** Specification for Steel, Strip, High-Carbon, Cold-Rolled
- A700** Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- A751** Test Methods and Practices for Chemical Analysis of Steel Products
- A941** Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
- A1008/A1008M** Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable

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.

A1018/A1018M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E290 Test Methods for Bend Testing of Material for Ductility

2.2 *Military Standards:*³

MIL-STD-129 Marking for Shipment and Storage

2.3 *Federal Standards:*³

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)

Fed. Std. No. 183 Continuous Identification Marking of Iron and Steel Products

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *Product Types:*

3.1.2 *hot-rolled strip*—manufactured by hot rolling billets or slabs to the required thickness; it may be produced single width or by rolling multiple width and slitting to the desired width; it can be supplied in coils or cut lengths as specified.

Width, in.		Thickness, in.	
Over	Through	Over	Through
...	3½	0.044	0.203
3½	6	0.044	0.203
6	12	0.044	0.230 excl

Width, mm		Thickness, mm	
Over	Through	Over	Through
...	100	1.2	5.0
100	200	1.2	5.0
200	300	1.2	6.0, excl

Hot-rolled, high-strength, low-alloy strip is commonly available by size as follows:

Width, in.		Thickness, in.		
Over	Through	From	Through	
...	6	0.054	0.203	Coils & Cut Lengths
6	12	0.054	0.230	Coils Only
				0.230 excl

Width, mm		Thickness, mm	
Over	Through	Over	Through
...	200	1.8	5.0
200	300	1.8	6.0, excl

4. Materials and Manufacture

4.1 Unless otherwise specified, hot-rolled material shall be furnished hot-rolled, not annealed or pickled.

5. Chemical Composition

5.1 *Limits:*

5.1.1 The chemical composition shall be in accordance with the applicable product specification. However, if other compositions are required for carbon steel, they shall be prepared in accordance with Specification **A568/A568M**, Appendix X2.

5.1.2 Where the material is used for fabrication by welding, care must be exercised in the selection of chemical composition or mechanical properties to ensure compatibility with the welding process and its effect on altering the properties.

5.2 *Cast or Heat (Formerly Ladle) Analysis:*

5.2.1 An analysis of each cast or heat of steel shall be made by the manufacturer to determine the percentage of elements specified or restricted by the applicable specification.

5.2.2 When requested, cast or heat analysis for elements listed or required shall be reported to the purchaser or to its representative.

5.3 *Product, Check, or Verification Analysis:*

5.3.1 Nonkilled steels (such as capped or rimmed) are not technologically suited to product analysis due to the nonuniform character of their chemical composition and therefore, the tolerances referenced in **5.3.2** do not apply. Product analysis is appropriate on these types of steel only when misapplication is apparent or for copper when copper steel is specified.

5.3.2 For steels other than nonkilled (capped or rimmed), product analysis may be made by the purchaser. The chemical analysis shall not vary from the limits specified by more than the amounts in Specification **A568/A568M**, subsection 5.3 (Table 2 in **A568/A568M**). The several determinations of any element in a cast shall not vary both above and below the specified range.

5.4 *Sampling for Product Analysis:*

5.4.1 To indicate adequately the representative composition of a cast by product analysis, it is general practice to select samples to represent the steel, as fairly as possible, from a minimum number of pieces as follows: three pieces for lots up to 15 tons inclusive, and six pieces for lots over 15 tons [15 Mg].

5.4.2 When the steel is subject to tension test requirements, samples for product analysis may be taken either by drilling entirely through the used tension test specimens themselves or in accordance with **5.4.3**.

5.4.3 When the steel is not subject to tension test requirements, the samples for analysis must be taken by milling or drilling entirely through the strip in a sufficient number of places so that the samples are representative of the entire strip. The sampling may be facilitated by folding the strip both ways, so that several samples may be taken at one drilling. Steel subjected to certain heating operations by the purchaser may not give chemical analysis results that properly represent its original composition. Therefore, users must analyze chips taken from the steel in the condition in which it is received from the steel manufacturer.

5.5 *Specimen Preparation*—Drillings or chips must be taken without the application of water, oil, or other lubricant, and must be free of scale, grease, dirt, or other foreign substances. They must not be overheated during cutting to the extent of causing decarburization. Chips must be well mixed, and those too coarse to pass a No. 10 (2.00 mm) sieve or too fine to

³ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.