Designation: A684/A684M – 25a

Standard Specification for Steel, Strip, High-Carbon, Cold-Rolled[1]

This standard is issued under the fixed designation A684/A684M; 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 cold-rolled, high-carbon strip in coils or cut lengths. Strip is classified as product that is 0.300 in. [7.50 mm] or less in thickness and over ½ in. to 23 15⁄16 in. [12.5 mm to 600 mm] in width, inclusive. Strip products may be available in thicknesses greater than 0.300 in. [7.50 mm], widths ½ in. [12.5 mm] and narrower, or widths wider than 23 15⁄16 in. [600 mm], however the tolerances are based on agreement between purchaser and supplier. The maximum of the specified carbon range is over 0.25 % to 1.35 %, inclusive. It is furnished in the following types as specified:

1.1.1 Spheroidized annealed high-carbon steel is intended for applications requiring maximum cold forming.

1.1.2 Annealed high-carbon steel is intended for applications requiring moderate cold forming.

1.1.3 Intermediate hardness high-carbon steel is intended for applications where cold forming is slight or a stiff, springy product is needed, or both. It is produced to specified Rockwell hardness ranges established between the producer and user, the maximum being higher than obtained for the annealed type.

1.1.4 Full hard high-carbon steel is intended for flat applications. Full hard can be produced with either a pearlitic or spheroidized microstructure or a mixture of both. The minimum hardness should be established between the producer and user.

1.2 This specification is applicable for orders in either inch-pound units or SI units.

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

1.4 The tolerances in this specification are different than those in Specification A568/A568M and Specification A109/A109M.

1.5 For the purpose of determining conformance with this specification, 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.

1.6 This specification is 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. The metric portions of the tables herein list permissible variations in dimensions and mass (see 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 SI tolerances 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*.

1.7 *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

A700 Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment

[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.

Current edition approved Dec. 1, 2025. Published December 2025. Originally approved in 1973. Last previous edition approved in 2025 as A684/A684M – 25. DOI: 10.1520/A0684_A0684M-25A.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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 Heat Analysis Chemical Composition, %

Steel Designation No.	Carbon	Manganese	Phosphorus, max	Sulfur, max	Silicon
1030	0.28 to 0.34	0.60 to 0.90	0.030	0.035	[A]
1035	0.32 to 0.38	0.60 to 0.90	0.030	0.035	[A]
1040	0.37 to 0.44	0.60 to 0.90	0.030	0.035	[A]
1045	0.43 to 0.50	0.60 to 0.90	0.030	0.035	[A]
1050	0.48 to 0.55	0.60 to 0.90	0.030	0.035	[A]
1055	0.50 to 0.60	0.60 to 0.90	0.030	0.035	[A]
1060	0.55 to 0.65	0.60 to 0.90	0.030	0.035	[A]
1064[B]	0.59 to 0.70	0.50 to 0.80	0.030	0.035	[A]
1065	0.60 to 0.70	0.60 to 0.90	0.030	0.035	[A]
1070	0.65 to 0.75	0.60 to 0.90	0.030	0.035	[A]
1074	0.70 to 0.80	0.50 to 0.80	0.030	0.035	[A]
1075	0.70 to 0.80	0.40 to 0.70	0.030	0.035	[A]
1080	0.75 to 0.88	0.60 to 0.90	0.030	0.035	[A]
1085	0.80 to 0.93	0.70 to 1.00	0.030	0.035	[A]
1086	0.80 to 0.93	0.30 to 0.50	0.030	0.035	[A]
1095	0.90 to 1.03	0.30 to 0.50	0.030	0.035	[A]

[A] Silicon composition as one of the following:
Type 1: 0.15–0.30
Type 2: 0.10 max
Or other silicon ranges are permissible when agreed upon by purchaser and producer.
[B] 1064 is not an SAE steel grade.

A751 Test Methods and Practices for Chemical Analysis of Steel Products
A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
A1073/A1073M Practice for Using Hand Micrometers to Measure the Thickness of Uncoated Steel Sheet and Nonmetallic and Metallic-Coated Steel Sheet
E3 Guide for Preparation of Metallographic Specimens
E18 Test Methods for Rockwell Hardness of Metallic Materials
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
E430 Test Methods for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry

2.2 *Federal Standards:*
Fed. Std. No. 123 Marking for Shipments (Civil Agencies)[3]
Fed. Std. No. 183 Continuous Identification Marking of Iron and Steel Products[3]

2.3 *Military Standard:*
MIL-STD-129 Marking for Shipping and Storage[3]

2.4 *SAE Standard:*
J 1086 Recommended Practice for Numbering Metals and Alloys (UNS)[4]

3. Terminology

3.1 *Definitions*—For definitions of other terms used in this specification refer to Terminology A941.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *burr, n*—metal displaced beyond the plane of the surface by slitting or shearing.

3.2.2 *lot, n*—quantity of material of the same type, size, and finish produced at one time from the same cast or heat, and heat treated in the same heat-treatment cycle.

3.2.3 *stretcher strains, n*—elongated markings that appear on the surface of the strip when dead soft (fully annealed) material is deformed beyond its yield point (see 5.2).

4. Ordering Information

4.1 Orders for material under this specification shall include the following information:

4.1.1 ASTM designation and date of issue.
4.1.2 Name and steel grade number.
4.1.3 Type (spheroidized annealed, annealed, intermediate hardness, full hard).
4.1.4 Hardness (if intermediate or full hard is specified).
4.1.5 Decarburization (if required).
4.1.6 Application.
4.1.7 Dimensions.
4.1.8 Coil size requirements.
4.1.9 Edge (indicate No. 1 round, square, and so forth).
4.1.10 Finish (indicate and specify).
4.1.11 Conditions (specify whether material is oiled or dry).
4.1.12 Package (bare coils, skid, and so forth).
4.1.13 Cast or heat analysis report (if required).
4.1.13.1 The additional chemical composition requirements (heat analysis) for copper, nickel, chromium, and molybdenum shall be specified as Limits L or Limits H. If no limits are specified, Limits L will be provided.
4.1.13.2 Silicon requirement specified (Type 1, Type 2, or other as agreed between purchaser and producer). If no specification is supplied, then Type 1 (see Table 1, Footnote A) will be supplied.
4.1.14 Special requirements (if required).

[3] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.
[4] Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.