



Designation: **A529/A529M – 14 A529/A529M – 19**

Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality¹

This standard is issued under the fixed designation A529/A529M; 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 carbon-manganese steel shapes, plates, and bars of structural quality for use in riveted, bolted, or welded construction of buildings and for general structural purposes.

1.2 Material under this specification is available in two grades:

Grade	Yield Strength, ksi [MPa]	Thickness
50 [345]	50 [345]	Plates to 1 in. [25 mm] thick to 15 in. [380 mm] wide Bars to 3½ in. [90 mm] Shapes with flange or leg thickness to 1½ in. [40 mm] inclusive
55 [380]	55 [380]	Plates to 1 in. [25 mm] thick to 15 in. [380 mm] wide Bars to 3 in. [75 mm] Shapes with flange or leg thickness to 1½ in. [40 mm] inclusive

1.3 When the steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service will be utilized. See Appendix X3 of Specification **A6/A6M** for information on weldability.

1.4 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other.

1.5 *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

A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

3. General Requirements for Delivery

3.1 Material furnished under this specification shall conform to the requirements of the current edition of Specification **A6/A6M**, for the ordered material, unless a conflict exists in which case this specification shall prevail.

4. Materials and Manufacture

4.1 The steel shall be killed, and such shall be affirmed in the test report by the inclusion of confirmed by a statement of *killed steel, steel* a value of 0.10 % or more for silicon content, or a value of 0.015 % or more for total aluminum content on the test report or by a report on the presence of a sufficient quantity of a strong deoxidizing element, such as silicon at 0.10 % or higher, or aluminum at 0.015 % 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 A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock and Ships.

Current edition approved Oct. 1, 2014 May 1, 2019. Published October 2014 May 2019. Originally approved in 1964. Last previous edition approved in 2009 2014 as A529/A529M – 05 (2009); A529/A529M – 14. DOI: 10.1520/A0529_A0529M-14; 10.1520/A0529_A0529M-19.

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

5. Chemical Composition

5.1 Heat Analysis:

5.1.1 The heat analysis shall conform to the requirements prescribed in **Table 1** and be reported in accordance with relevant sections of Specification **A6/A6M**.

5.1.2 In addition to the elements specified in **Table 1**, test reports shall include for information the chemical analysis for copper, columbium, chromium, nickel, molybdenum, and vanadium. When the amount of copper, chromium, nickel, molybdenum, or silicon is less than 0.02 %, the analysis may be reported as “<0.02 %.” When the amount of columbium or vanadium is less than 0.008 %, the analysis may be reported as “<0.008 %.”

5.2 Product Analysis:

5.2.1 The steel shall conform on product analysis to the requirements of **Table 1**, subject to the product analysis tolerances in Specification **A6/A6M**.

6. Tension Test

6.1 The material as represented by the test specimen shall conform to the requirements as to the tensile properties prescribed in **Table 2**.

7. Keywords

7.1 bars; bolted construction; carbon; frames; metal building systems; plates; riveted construction; shapes; steel; structural steel; trusses; welded construction

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[ASTM A529/A529M-19](#)

<https://standards.iteh.ai/catalog/standards/sist/17acb9f4-2e1e-4b40-9098-e85f45548db0/astm-a529-a529m-19>

TABLE 1 Chemical Requirements (Heat Analysis)

NOTE 1—A maximum of 1.50 % manganese is permissible, with an associated reduction of the carbon maximum of 0.01 percentage point for each 0.05 percentage point increase in manganese.

Element	Composition, %
	Grades 50 [345] and 55 [380]
Carbon, max	0.27
Manganese, max	1.35
Phosphorus, max	0.04
Sulfur, max	0.05
Silicon, max	0.40
Copper, min, when copper is specified	0.20