
Standard Specification for Steel Bars, Carbon and Alloy, Cold-Finished

AASHTO Designation: M 169-20 (2024)

Technically Revised: 2020

Reviewed but Not Updated: 2024

Technical Subcommittee: 4f, Metals

ASTM Designation: A108-18



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
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1. SCOPE
- 1.1.

This specification covers cold-finished carbon and alloy steel bars produced in straight length and coil. Cold-finished bars are suitable for heat treatment, for machining into components, or for use in the as-finished condition as shafting or in constructional applications or for other similar purposes (see Note 1). Grades of steel are identified by grade numbers or by chemical composition.
Note 1—A guide for the selection of steel bars is contained in ASTM A400.
- 1.2.

Some end uses may require one or more of the available designations shown under Supplementary Requirements. Supplementary requirements shall apply only when specified individually by the purchaser.
- 1.3.

The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. REFERENCED DOCUMENTS
- 2.1.

AASHTO Standard:
 - T 244, Mechanical Testing of Steel Products
- 2.2.

ASTM Standards:
 - A29/A29M, Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought
 - A304, Standard Specification for Carbon and Alloy Steel Bars Subject to End-Quench Hardenability Requirements
 - A322, Standard Specification for Steel Bars, Alloy, Standard Grades
 - A400, Standard Practice for Steel Bars, Selection Guide, Composition, and Mechanical Properties
 - A510/A510M, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel
 - A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality

- 2.3. *Other Documents:*
- SAE Handbook and SAE J1086 Recommended Practice for Numbering Metals and Alloys (UNS)¹
 - *AIST Bar Steels: Steel Product Manual*²

3. TERMINOLOGY

- 3.1. *Definition:*
- 3.1.1. *product tolerance levels*—cold-finished steel bars produced with up to three increasingly tight tolerance levels for the individual product characteristics, dependent on the method of manufacture necessary to meet the purchaser-ordered specifications requirements. (Select Product Tolerance Level 1 unless otherwise specified by the purchaser.)

4. ORDERING INFORMATION

- 4.1. *Orders for cold-finished steel bars to this specification should include the following items to adequately describe the material:*
- 4.1.1. Name of material;
- 4.1.2. AASHTO specification number and date of issue;
- 4.1.3. Chemical composition or steel grade designation or limits as defined in ASTM A29/A29M;
- 4.1.4. Silicon level (if required);
- 4.1.5. Additional machinability-enhancing elements (see Footnote F to Table 1 of ASTM A29/A29M);
- 4.1.6. Surface condition (surface tolerances listed in Table A1.7, Table A1.8, and Table A1.9);
- 4.1.7. Tolerance levels (reference tolerances listed in Table A1.1 through Table A1.9);
- 4.1.8. Shape (round, hexagon, square, flat, etc.), size, and length;
- 4.1.9. Report of heat analysis (if required);
- 4.1.10. End use;
- 4.1.11. Additions to the specification and special or supplementary requirements (if required); and
- 4.1.12. For coiled product, the coil mass, inside diameter, outside diameter, and coil height limitations (when required).

Note 2—A typical ordering description is as follows: Steel Bar, M169, Dated ____; ASTM Steel Grade—1117; Coarse Grain; Cold Drawn; 1.500-in. (38.10-mm) diameter round; 12 ft (3657.61 mm) long; Heat Analysis Required; Precision Machine Parts.

Note 3—A more complex ordering description is as follows: Steel Bar; M169, Dated ____; ASTM Steel Grade—1045; Fine Grain; Cold Drawn, Turned, Ground and Polished; chamfer both ends; Mechanical Property Tests Results; Hardness test; 2.000-in. (50.80-mm) diameter round; 12 ft (3657.61 mm) long; Heat Analysis Required; Precision Machined Parts.

5. GENERAL REQUIREMENTS

- 5.1. Material furnished under this specification shall conform to the applicable requirements of the current edition of ASTM A29/A29M.

6. MATERIALS AND MANUFACTURE

- 6.1. *Feedstock*—Cold-finished bars shall be produced from hot-wrought carbon or alloy steel bars (ASTM A29/A29M) or from hot-wrought rod designed for cold-finished bars (ASTM A510/A510M).
- 6.2. *Condition*—The product bars shall be furnished in one of the following conditions as specified by the purchaser:
- 6.2.1. *Rounds:*
- 6.2.1.1. Cold drawn;
- 6.2.1.2. Cold drawn, turned, and polished;
- 6.2.1.3. Cold drawn, ground, and polished;
- 6.2.1.4. Cold drawn, turned, ground, and polished;
- 6.2.1.5. Cold drawn, turned, and ground;
- 6.2.1.6. Hot wrought, turned, and polished;
- 6.2.1.7. Hot wrought, turned, ground, and polished;
- 6.2.1.8. Hot wrought, turned, and ground; and
- 6.2.1.9. Hot wrought, rough turned.
- 6.2.2. *Squares, Hexagons:*
- 6.2.2.1. Cold drawn, and
- 6.2.2.2. Cold rolled.
- 6.2.3. *Flats:*
- 6.2.3.1. Cold drawn, and
- 6.2.3.2. Cold rolled.
- 6.2.4. *Special Bar Sections:*
- 6.2.4.1. Cold drawn, and
- 6.2.4.2. Cold rolled.