



Designation: A 108 – 99

Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality¹

This standard is issued under the fixed designation A 108; 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 standard quality cold-finished carbon steel bars produced to chemical compositions. Standard quality 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 (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 Practice A 400.

1.2 Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification A 29/A 29M.

1.3 Some end uses may require material superior to standard quality involving one or more of the available designations shown under Supplementary Requirements. Supplementary requirements shall apply only when specified individually by the purchaser.

2. Referenced Documents

2.1 ASTM Standards:

A 29/A 29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for²

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

A 400 Practice for Steel Bars, Selection Guide, Composition, and Mechanical Properties²

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel³

A 576 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality²

E 45 Test Methods for Determining the Inclusion Content of Steel⁴

E 527 Practice for Numbering Metals and Alloys (UNS)⁵

2.2 Other Documents:

SAE J1086 Recommended Practice for Numbering Metals and Alloys (UNS)⁶

SAE Handbook⁶

Federal Standard 66 C Steel, Chemical Composition and Hardenability⁷

ASTM Steel Product Manual for Cold Finished Bars⁸

3. Terminology

3.1 Definition:

3.1.1 *standard quality*—cold-finished carbon steel bars produced from special quality hot-wrought carbon steel bars or rods of equivalent quality.

3.1.1.1 *Discussion*—Bars of standard quality are commonly produced in standard chemical grade compositions or to mechanical property specifications and are subject to product analysis tolerances.

3.1.1.2 *Discussion*—The available sections and sizes are covered by Specification A 29/A 29M. The bars are normally produced in cut lengths but some small sizes are supplied in coils. The producer should be consulted regarding sections and sizes available in coils.

4. Ordering Information

4.1 Orders for cold-finished bars to this specification should include the following items to adequately describe the material:

4.1.1 Name of material,

4.1.2 ASTM specification number and date of issue,

4.1.3 Chemical composition grade designation or limits,

4.1.4 Silicon, if required,

4.1.5 Additional machinability-enhancing elements (see Footnote D to Table 1),

4.1.6 Condition,

4.1.7 Quality,

4.1.8 Shape (round, hex, square, etc.), size, and length,

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.15 on Bars.

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² *Annual Book of ASTM Standards*, Vol 01.05.

³ *Annual Book of ASTM Standards*, Vol 01.03.

⁴ *Annual Book of ASTM Standards*, Vol 03.01.

⁵ *Annual Book of ASTM Standards*, Vol 01.01.

⁶ Available from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

⁷ Available from the Standardization Documents Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094 Attn: NPODS.

⁸ Available from the American Iron and Steel Institute, 150 East 42nd St., New York, NY 10017.

TABLE 1 Composition of Cold-Finished Carbon Steel Bars

NOTE 1—Grade designations and compositions correspond to the respective AISI designations and compositions.

UNS Designation ^A	Grade Designation	Carbon, %	Manganese, %	Phosphorus, %	Sulfur, %
Open-Hearth, Basic-Oxygen, and Electric-Furnace Grades ^{B,C,D}					
G 10080	1008	0.10 max	0.30–0.50	0.040 max	0.050 max
G 10100	1010	0.08–0.13	0.30–0.60	0.040 max	0.050 max
G 10150	1015	0.13–0.18	0.30–0.60	0.040 max	0.050 max
G 10160	1016	0.13–0.18	0.60–0.90	0.040 max	0.050 max
G 10180	1018	0.15–0.20	0.60–0.90	0.040 max	0.050 max
G 10200	1020	0.18–0.23	0.30–0.60	0.040 max	0.050 max
G 10220	1022	0.18–0.23	0.70–1.00	0.040 max	0.050 max
G 10250	1025	0.22–0.28	0.30–0.60	0.040 max	0.050 max
G 10300	1030	0.28–0.34	0.60–0.90	0.040 max	0.050 max
G 10350	1035	0.32–0.38	0.60–0.90	0.040 max	0.050 max
G 10400	1040	0.37–0.44	0.60–0.90	0.040 max	0.050 max
G 10450	1045	0.43–0.50	0.60–0.90	0.040 max	0.050 max
G 10500	1050	0.48–0.55	0.60–0.90	0.040 max	0.050 max
G 10950	1095	0.90–1.03	0.30–0.50	0.040 max	0.050 max
Open-Hearth, Basic-Oxygen, and Electric-Furnace Free Cutting Grades ^{B,C,D,E}					
G 11170	1117	0.14–0.20	1.00–1.30	0.040 max	0.08–0.13
G 11180	1118	0.14–0.20	1.30–1.60	0.040 max	0.08–0.13
G 11370	1137	0.32–0.39	1.35–1.65	0.040 max	0.08–0.13
G 11410	1141	0.37–0.45	1.35–1.65	0.040 max	0.08–0.13
G 11440	1144	0.40–0.48	1.35–1.65	0.040 max	0.24–0.33
G 11510	1151	0.48–0.55	0.70–1.00	0.040 max	0.08–0.13
G 12110	1211	0.13 max	0.60–0.90	0.07–0.12	0.10–0.15
G 12120	1212	0.13 max	0.70–1.00	0.07–0.12	0.16–0.23
G 12130	1213	0.13 max	0.70–1.00	0.07–0.12	0.24–0.33
...	12L14 ^F	0.15 max	0.85–1.15	0.04–0.09	0.26–0.35
G 12150	1215	0.09 max	0.75–1.05	0.04–0.09	0.26–0.35

^A New designations established in accordance with Practice E 527 and SAE J1086.

^B When silicon is required, the following ranges and limits are commonly specified: 0.10 % max, 0.10–0.20 %, 0.15–0.35 %, or 0.20–0.40 %.

^C When required, lead is specified as an added element to a standard steel. A range from 0.15–0.35 %, inclusive, is commonly specified. Such a steel is identified by inserting the letter "L" between the second and third numeral of the grade number, for example, 11L17. A cast or heat analysis is not determinable when lead is added to the ladle stream.

^D The elements bismuth, calcium, selenium, or tellurium may be added as agreed upon between purchaser and supplier.

^E Grades 1211, 1212, 1213, 12L14, and 1215 are not supplied with a specified silicon content.

^F Lead content shall be 0.15–0.35 %.

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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 weights, inside diameter and outside diameter limitations, when required.

NOTE 2—A typical ordering description is as follows: Steel Bar, ASTM A 108, dated ____; SAE 1117; Coarse Grain; Cold Drawn; 6000 lb of 1.500-in. diameter by 10.0 to 12.0 ft long; Heat Analysis Required; Screw Machine Parts.

5. Materials and Manufacture

5.1 *Melting Practice*—The steel shall be made by one or more of the following primary processes: open-hearth, basic-oxygen, or electric-furnace. The primary melting may incorporate separate degassing or refining and may be followed by secondary melting using electroslog remelting or vacuum-arc remelting. Where secondary melting is employed, the heat shall be defined as all of the ingots remelted from a single primary heat.

5.2 *Deoxidation:*

5.2.1 Unless otherwise specified, the steel may be rimmed, capped, semi-killed, or killed at the manufacturer's option.

5.2.2 When required, the deoxidation practice, including killed steel, may be specified.

5.3 *Discard*—Sufficient discard shall be made to ensure freedom from pipe and undue segregation.

5.4 *Redraw Stock*—The bars shall be produced from special quality hot-wrought carbon steel bars (Specification A 576) or from hot-wrought rods designated for cold-finished bars (Specification A 510).

5.5 *Condition*—The bars shall be furnished in one of the following conditions as specified by the purchaser:

5.5.1 *Rounds:*

5.5.1.1 Cold drawn,

5.5.1.2 Cold drawn, turned, and polished,

5.5.1.3 Cold drawn, ground, and polished,

5.5.1.4 Cold drawn, turned, ground, and polished,

5.5.1.5 Hot wrought, turned, and polished, or

5.5.1.6 Hot wrought, turned, ground, and polished.

5.5.2 *Squares, Hexagons*—Cold drawn.

5.5.3 *Flats:*

5.5.3.1 Cold drawn or

5.5.3.2 Cold rolled.

5.6 *Heat Treatment:*

5.6.1 Unless otherwise specified, the bars shall be furnished as cold finished except that when the maximum of the carbon range is over 0.55 % they shall be annealed for cold finishing.