



Designation: A1035/A1035M – 24

Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement¹

This standard is issued under the fixed designation A1035/A1035M; 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.

1. Scope

1.1 This specification covers deformed and plain low-carbon, chromium, steel bars, in cut lengths and coils for concrete reinforcement. These bars are furnished in three alloy types depending on the chromium range content. The standard sizes and dimensions of deformed bars and their number designations are given in [Table 1](#).²

1.2 Bars are of two minimum yield strength levels as defined in [9.2](#): namely, 100 000 psi [690 MPa], and 120 000 psi [830 MPa] designated as Grade 100 [690] and Grade 120 [830], respectively.

1.3 Bars are furnished to three different chemical compositions, designated as Alloy Type CL, CM, and CS. Chemical compositions are shown in [Table 2](#).

1.4 Plain bars, in sizes up to and including 2.25 in. [57.2 mm] 2½ in. [63.5 mm] in diameter in coils and cut lengths, when ordered shall be furnished under this specification in Grade 100 [690] and Grade 120 [830]. For ductility properties (elongation and bending), test provisions of the nearest smaller nominal diameter deformed bar size shall apply. Requirements providing for deformations and marking shall not be applicable.

NOTE 1—Welding of the material in this specification should be approached with caution since no specific provisions have been included to enhance its weldability. When this steel is to be welded, a welding

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 A01.05 on Steel Reinforcement.

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² Commercial Metals Company has several patented materials (US Patents #6,273,968, #6,709,534, #7,118,637, #7,214,278) that meet this specification. Interested parties are invited to submit information regarding the identification of an alternative(s) to this patented item to the ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

procedure suitable for the chemical composition and intended use or service should be used.

NOTE 2—Designers need to be aware that design codes and specifications may not recognize the use of the No. 20 [64] bar, the largest bar size included in this specification. Structural members reinforced with No. 20 [64] bars may require approval of the building official or other appropriate authority and require special detailing to ensure adequate performance at service and factored loads.

1.5 Requirements for alternate bar sizes are presented in [Annex A1](#). The requirements in [Annex A1](#) only apply when specified by the purchaser (see [4.2.4](#)).

1.6 A supplementary requirement (S1) is provided for use where bend testing of bar designation Nos. 14 and 18 [43, 57], and bar designation Nos. 40, 50, and 60 in [Annex A1](#), is required by the purchaser. The supplementary requirement applies only when specified in the purchase order.

1.7 The text of this specification references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

1.8 This specification is applicable for orders in either inch-pound units (as Specification A1035) or in SI units (as Specification A1035M).

1.9 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. 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 specification.

1.10 *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.*

**TABLE 1 Deformed Bar Designation Numbers, Nominal Weights [Masses], Nominal Dimensions, and Deformation Requirements**

Bar Designation No.	Nominal Weight, lb/ft [Nominal Mass, kg/m]	Nominal Dimensions ^A			Deformation Requirements, in. [mm]		
		Diameter, in. [mm]	Cross-Sectional Area, in. ² [mm ²]	Perimeter in. [mm]	Maximum Average Spacing	Minimum Average Height	Maximum Gap (Chord of 12.5 % of Nominal Perimeter)
3 [10]	0.376 [0.560]	0.375 [9.5]	0.11 [71]	1.178 [29.9]	0.262 [6.7]	0.015 [0.38]	0.143 [3.6]
4 [13]	0.668 [0.994]	0.500 [12.7]	0.20 [129]	1.571 [39.9]	0.350 [8.9]	0.020 [0.51]	0.191 [4.9]
5 [16]	1.043 [1.552]	0.625 [15.9]	0.31 [199]	1.963 [49.9]	0.437 [11.1]	0.028 [0.71]	0.239 [6.1]
6 [19]	1.502 [2.235]	0.750 [19.1]	0.44 [284]	2.356 [59.8]	0.525 [13.3]	0.038 [0.97]	0.286 [7.3]
7 [22]	2.044 [3.042]	0.875 [22.2]	0.60 [387]	2.749 [69.8]	0.612 [15.5]	0.044 [1.12]	0.334 [8.5]
8 [25]	2.670 [3.973]	1.000 [25.4]	0.79 [510]	3.142 [79.8]	0.700 [17.8]	0.050 [1.27]	0.383 [9.7]
9 [29]	3.400 [5.060]	1.128 [28.7]	1.00 [645]	3.544 [90.0]	0.790 [20.1]	0.056 [1.42]	0.431 [10.9]
10 [32]	4.303 [6.404]	1.270 [32.3]	1.27 [819]	3.990 [101.3]	0.889 [22.6]	0.064 [1.63]	0.487 [12.4]
11 [36]	5.313 [7.907]	1.410 [35.8]	1.56 [1006]	4.430 [112.5]	0.987 [25.1]	0.071 [1.80]	0.540 [13.7]
14 [43]	7.65 [11.38]	1.693 [43.0]	2.25 [1452]	5.32 [135.1]	1.185 [30.1]	0.085 [2.16]	0.648 [16.5]
18 [57]	13.60 [20.24]	2.257 [57.3]	4.00 [2581]	7.09 [180.1]	1.58 [40.1]	0.102 [2.59]	0.864 [21.9]
20 [64] ^B	16.69 [24.84]	2.500 [63.5]	4.91 [3167]	7.85 [199.5]	1.75 [44.5]	0.113 [2.86]	0.957 [24.3]

^A The nominal dimensions of a deformed bar are equivalent to those of a plain round bar having the same weight [mass] per foot [metre] as the deformed bar.

^B Refer to **Note 2**.

TABLE 2 Chemical Compositions of Alloy Type

Alloy Type	Composition Max, % ^A						
	Carbon	Chromium	Manganese	Nitrogen	Phosphorus	Sulfur	Silicon
1035 CL	0.3	2.0–3.9	1.5	0.05	0.035	0.045	0.75
1035 CM	0.2	4.0–10.9	1.5	0.05	0.035	0.045	0.75
1035 CS	0.15	8.0–10.9	1.5	0.05	0.035	0.045	0.75

^A Maximum unless range is indicated; percentages refer to weight [mass] percentages.

2. Referenced Documents

2.1 ASTM Standards:³

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

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A510/A510M Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel

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

A751 Test Methods and Practices for Chemical Analysis of Steel Products

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C1218/C1218M Test Method for Water-Soluble Chloride in Mortar and Concrete

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

E290 Test Methods for Bend Testing of Material for Ductility

G3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing

2.2 U.S. Military Standard:⁴

MIL-STD-129 Marking for Shipment and Storage

2.3 U.S. Federal Standard:⁴

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

3. Terminology

3.1 Definitions of Terms Specific to This Specification:

3.1.1 *deformations, n*—transverse protrusions on a deformed bar.

3.1.2 *deformed bar, n*—steel bar with protrusions; a bar that is intended for use as reinforcement in reinforced concrete construction.

3.1.2.1 *Discussion*—The surface of the bar is provided with protrusions that inhibit longitudinal movement of the bar relative to the concrete surrounding the bar in such construction. The protrusions conform to the provisions of this specification.

3.1.3 *lot, n*—all the bars of one bar size and pattern of deformations contained in an individual shipping release or shipping order.

3.1.4 *plain bar, n*—steel bar without protrusions.

3.1.5 *rib, n*—longitudinal protrusion on a deformed bar.

4. Ordering Information

4.1 Orders for low-carbon, chromium steel bars for concrete reinforcement under this specification shall contain the following information:

4.1.1 Quantity (weight) [mass];

4.1.2 Deformed or plain;

4.1.3 Bar designation number (size) of deformed bars, or nominal diameter (size) of plain bars;

4.1.4 Cut lengths or coils;

³ 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.

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