



Designation: A 311/A 311M – 95 (Reapproved 2000)

Standard Specification for Cold-Drawn, Stress-Relieved Carbon Steel Bars Subject to Mechanical Property Requirements¹

This standard is issued under the fixed designation A 311/A 311M; 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 two classes, nine grades, and four conditions of stress-relieved cold-drawn carbon steel bars produced to mechanical property requirements. One class, B, is cold drawn with higher than normal (heavy) drafts to provide higher strength levels, and four grades provide improved machinability.

1.2 Supplementary Requirements, S1 through S6, of an optional nature are provided.

1.3 The values stated in inch-pound units or SI units are to be regarded as the 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. Combining values from the two systems may result in nonconformance with the specification.

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

E 527 Practice for Numbering Metals and Alloys (UNS)⁴

3. Terminology

3.1 Definitions:

3.1.1 *stress relieving*—heating to a suitable temperature, holding long enough to reduce residual stresses, and then cooling slowly enough to minimize the development of new residual stresses.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *heavy draft*—Using higher than normal drafts (approximately 10 % through 35 % reduction), followed by stress

relieving, produces higher tensile and yield strengths provided an appropriate composition is used; for example, medium carbon with normal or higher manganese content.

4. Classification

4.1 The bars are furnished in the following classes and grades, and in the conditions shown in 6.4.

4.1.1 *Class A*—Normal-draft cold-drawn and stress-relieved rounds, squares, hexagons, and flats in the following grades:⁵

Grades	UNS Designations ⁵
1018	G10180
1035	G10350
1045	G10450
1050	G10500
1541	G15410
1117	G11170
1137	G11370
1141	G11410
1144	G11440

4.1.2 *Class B*—Heavy-draft cold-drawn and stress-relieved rounds and hexagons in the following grades:

Grade	UNS Designations ⁵
1045	G10450
1050	G10500
1541	G15410
1141	G11410
1144	G11440

5. Ordering Information

5.1 Orders for material under this specification should include the following information as required to adequately describe the desired material:

5.1.1 Quantity (weight [mass] or number of pieces),

5.1.2 Name of material (carbon steel bars, cold drawn, stress relieved),

5.1.3 Condition 8.3,

5.1.4 Cross-sectional shape,

5.1.5 Size,

5.1.6 Length,

5.1.7 Class and grade,

5.1.8 Report of heat analysis, tensile properties Section 11,

5.1.9 ASTM designation A 311 or A 311M,

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 A01.15 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 01.01.

⁵ New designation established in accordance with Practice E 527 and SAE J 1086.