



Designation: A 434 – 90a (Reapproved 2000)

Standard Specification for Steel Bars, Alloy, Hot-Wrought or Cold-Finished, Quenched and Tempered¹

This standard is issued under the fixed designation A 434; 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 hot-wrought and cold-finished quenched and tempered alloy steel bars.

1.2 Hot-wrought bars are available in three strength level classes designated BB, BC, and BD, and cold-finished bars in two strength level classes designated BB and BC. The bars are available in the conditions specified in 4.4 subject to the size limitations shown.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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 112 Test Methods for Determining Average Grain Size⁴

3. Ordering Information

3.1 Orders for material under this specification should include the following information:

3.1.1 Quantity (weight or number of pieces),

3.1.2 Name of material (heat-treated alloy steel bars),

3.1.3 Method of finish (condition) (4.4),

3.1.4 Dimensions, including length (if hot-wrought bars are for cold finishing, the cold-finished size should also be specified),

3.1.5 ASTM designation and date of issue,

3.1.6 Chemical composition grade (Section 5),

3.1.7 Strength class (Section 8 and Table 1),

3.1.8 Test report, if required (Section 11),

3.1.9 Supplementary Requirements or Special Requirements, if required, and

3.1.10 End use.

NOTE 1—A typical ordering description is as follows: 10 000 lb, Heat-Treated Alloy Steel Bars, Hot Rolled, 1.000 in. diameter \times 10 ft, ASTM A 434 dated ____, Grade 4140, Class BB, Test Report Required, Motor Shafts.

4. Materials and Manufacture

4.1 *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 electroslag 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.

4.2 *Discard*—Sufficient discard shall be made to secure freedom from injurious piping and undue segregation.

4.3 *Slow Cooling*—Hot-wrought alloy bars shall, immediately after rolling, be allowed to cool to a temperature below the critical range under suitable conditions to prevent injury by too rapid cooling.

4.4 *Condition*—Bars shall be furnished in one of the following conditions, as specified by the purchaser. Generally, size limits for various methods of processing round bars are:

Hot-wrought or hot-wrought descaled	9½ in. (241.3 mm), max
Cold-drawn	⅝ to 4 in. (3.2 to 102 mm), incl
Cold-drawn, ground, and polished	⅝ to 4 in. (3.2 to 102 mm), incl
Turned and polished	¾ to 9 in. (19.1 to 229 mm), incl
Turned, ground, and polished	¾ to 9 in. (19.1 to 229 mm), incl

4.5 Heat Treatment:

4.5.1 Heat treatment shall include quenching and tempering for all classes of material. The material shall be uniformly heated to the austenitizing temperature, soaked for a sufficient length of time to produce the desired structure (a lot thus heated being known as a “quenching charge”), and quenched in

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 03.01.