



Designation: **A663/A663M—17 A663/A663M – 23**

Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties¹

This standard is issued under the fixed designation A663/A663M; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers hot-wrought merchant quality carbon steel bars and bar size shapes produced to mechanical property requirements and intended for noncritical constructional applications (see [7-28.2](#)).

1.2 Merchant quality hot-wrought steel bar is available in the following ranges of size and section:

1.2.1 Rounds, squares, and hexagons with diameters or distance across flats under 3 in. [75 mm].

1.2.2 Bar size shapes with maximum dimensions under 3 in. [75 mm].

1.2.3 Other bar sections with weight per foot under 40.84 lb/ft [60.78 kg/m].

1.2.4 Flats 6 in. [152 mm] or under in width, over 0.203 in. [over 5 mm in thickness up to 150 mm in width] in thickness, and under 40.84 lb/ft or 12 in.² [77.4 cm²] in cross-sectional area.

1.2.5 Flats over 6 in. to 8 in., inclusive in width, 0.230 in. and over [over 6 mm in thickness and over 50 mm through ~~200 mm~~ 200 mm in width] in thickness and under 40.84 lb/ft [60.78 kg/m] or 12 in.² [77.4 cm²] in cross-sectional area.

1.2.6 Hot-wrought merchant quality carbon steel bars subject to mechanical property requirements are hot wrought in straight lengths only.

1.3 Some applications may require one or more of the available designations shown under supplementary requirements.

NOTE 1—Special quality hot-wrought carbon steel bars subject to mechanical property requirements are covered in Specification [A675/A675M](#).

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. 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 standard.

1.5 *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.*

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

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*A Summary of Changes section appears at the end of this standard

2. Referenced Documents

2.1 *ASTM Standards:*²

- [A29/A29M Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought](#)
- [A370 Test Methods and Definitions for Mechanical Testing of Steel Products](#)
- [A675/A675M Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties](#)
- [A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys](#)
- [E290 Test Methods for Bend Testing of Material for Ductility](#)

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this standard, refer to Terminology [A941](#).

4. Ordering Information

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

- 4.1.1 Quantity (weight or number of pieces),
- 4.1.2 Dimensions (cross-sectional shape, size, and length),
- 4.1.3 Name of material (merchant quality carbon steel bars),
- 4.1.4 Specification number and date of issue,
- 4.1.5 Grade designation,
- 4.1.6 Copper bearing steel (if required),
- 4.1.7 Heat analysis or test report (request, if required),
- 4.1.8 Application and processing, and
- 4.1.9 Supplementary requirements (if required).

5. Manufacture

5.1 The steel shall be made by the basic-oxygen or electric-furnace process.

6. Chemical Composition

6.1 The steel shall conform on heat analysis to the following chemical requirements:

Phosphorus, max, percent	0.04
Phosphorus, max, percent	0.040
Sulfur, max, percent	0.05
Sulfur, max, percent	0.050
Copper, when copper steel is specified, min, percent	0.20

7. Mechanical Properties

7.1 *Tensile Requirements:*

7.1.1 The material as represented by the test specimen shall conform to the applicable requirements in [Table 1](#).

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.