Designation: A 575 – 96 (Reapproved 2007)

Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades[1]

This standard is issued under the fixed designation A 575; 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 merchant quality carbon steel bars produced to a chemical composition. Merchant quality bars are used for structural and similar miscellaneous bar applications involving moderate cold bending, moderate hot forming, punching, and welding as used in the production of noncritical parts. Moderate cold bending involves a generous bend radius with the axis of the bend transverse to the direction of rolling.

1.2 Special quality hot-wrought carbon steel bars are covered in Specification A 576.

1.3 Some end uses may require one or more of the available designations shown under Supplementary Requirements.

1.4 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

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

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

3. Ordering Information

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

3.1.1 ASTM specification number and date of issue,

3.1.2 Grade designation or chemical composition (Section 7 and appropriate chemical analysis tables),

3.1.3 Supplementary Requirements or additions, if required,

3.1.4 Dimensions and quantity, and

3.1.5 End use and processing.

4. Materials and Manufacture

4.1 The steel shall be made by the open-hearth, basic-oxygen, or electric-furnace process.

5. Conditions

5.1 Merchant quality bars are available in rounds, squares, round cornered squares, hexagons, and bar size shapes under 3 in. (76.2 mm), and in flats less than 40.8 lb/ft (60.7 kg/m). Hot-wrought merchant quality carbon steel bars are produced in cut lengths and coils; the producer should be consulted regarding sections and sizes available in coils.

5.2 Merchant quality is available within a composition of 0.50 % maximum carbon, 0.60 % maximum manganese, non-resulfurized, non-leaded. The phosphorus content is 0.04 %, max, and the sulfur content is 0.05 %, max. Merchant quality grades of steel are shown in Table 1 and chemical ranges and limits in Table 2; the grade numbers are designated with the prefix "M." Merchant quality bars are not produced to any specified silicon content, grain size, or other requirement that would influence the type of steel.

TABLE 1 Grade Designations and Chemical Compositions of Hot-Wrought Merchant Quality M Series Carbon Steel Bars

Grade Designation	Carbon, %	Manganese,[A] %	Phosphorus, max, %	Sulfur, max, %
M 1008	0.10 max	0.25–0.60	0.04	0.05
M 1010	0.07–0.14	0.25–0.60	0.04	0.05
M 1012	0.09–0.16	0.25–0.60	0.04	0.05
M 1015	0.12–0.19	0.25–0.60	0.04	0.05
M 1017	0.14–0.21	0.25–0.60	0.04	0.05
M 1020	0.17–0.24	0.25–0.60	0.04	0.05
M 1023	0.19–0.27	0.25–0.60	0.04	0.05
M 1025	0.20–0.30	0.25–0.60	0.04	0.05
M 1031	0.26–0.36	0.25–0.60	0.04	0.05
M 1044	0.40–0.50	0.25–0.60	0.04	0.05

[A] Unless prohibited by the purchaser, the manganese content shall be permitted to exceed 0.60 % on heat analysis to a maximum of 0.75 %, provided that the carbon range on heat analysis has the minimum reduced by 0.01 % for each 0.05 % manganese over 0.60 %.

5.3 Merchant quality bars shall be free of visible pipe; however, they may contain pronounced chemical segregation.

[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] 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.

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TABLE 2 Heat Chemical Ranges and Limits of Hot-Wrought Merchant Quality M Series Carbon Steel Bars

Element	Chemical Ranges and Limits, %		
	When Maximum of Specified Element is:	Range	Lowest Maximum
Carbon	...	...	0.10
	To 0.12 incl	...	...
	Over 0.12 to 0.24 incl	0.07	...
	Over 0.24 to 0.27 incl	0.08	...
	Over 0.27 to 0.50 incl	0.10	...
	...		
	...	...	0.35
Manganese[A]	To 0.60 incl	0.35	...
		...	...
Phosphorus	To 0.04 incl	...	0.04
Sulfur	To 0.05 incl	...	0.05
Copper	When copper is required 0.20 minimum is generally specified.	...	...

[A] Unless prohibited by the purchaser, the manganese content may exceed 0.60 % on heat analysis to a maximum of 0.75 %, provided that the carbon range on heat analysis has the minimum and maximum reduced by 0.01 % for each 0.05 % manganese over 0.60 %.

Internal porosity, surface seams, and other surface irregularities may be present in this quality.

6. Chemical Composition

6.1 The steel shall conform on heat analysis to the requirements of chemical composition in Table 1, or chemical compositions can be specified that conform to the ranges and limits in Table 2. The heat analysis shall be reported to the purchaser for the elements specified.

7. General Requirements

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

SUPPLEMENTARY REQUIREMENTS

One or more of the following supplementary requirements shall apply when specified by the purchaser.

S1. Special Straightness

S1.1 Bars may be specified to special straightness tolerance (see Specification A 29/A 29M).

S2. Cleaning

S2.1 The purchaser may specify that the surface of bars be descaled by pickling or blast cleaning.

S3. Coating

S3.1 The purchaser may specify oil coating on bars that have been descaled.

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