

## Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades<sup>1</sup>

This standard is issued under the fixed designation A575; 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 ( $\varepsilon$ ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

 $\epsilon^1$  NOTE—Sections 1.4 and 4.1 were editorially corrected in July 2013.

## 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 A576.

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 standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

## 2. Referenced Documents

2.1 ASTM Standards:<sup>2</sup>

A29/A29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for

A576 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 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, nonresulfurized, 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.

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

<sup>&</sup>lt;sup>1</sup> 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.

Current edition approved April 1, 2013. Published July 2013. Originally approved in 1967. Last previous edition approved in 2007 as A575 – 96 (2007). DOI: 10.1520/A0575-96R13E01.

<sup>&</sup>lt;sup>2</sup> 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.

# ∰ A575 – 96 (2013)<sup>ε1</sup>

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

Grade Designation	Carbon, %	Manganese, <sup>A</sup> %	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

 $^{\rm A}$  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 %.

#### 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 <sup>A</sup>	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.				

<sup>A</sup> 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 %.

## 7. General Requirements

7.1 Material furnished under this specification shall conform to the requirements of the current edition of Specification A29/A29M.

## 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 A29/A29M).

## 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.



ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).