

# 1996



## ANNUAL BOOK OF ASTM STANDARDS

SECTION

**1**

Iron and Steel Products



VOLUME  
**01.04**

Steel—Structural, Reinforcing,  
Pressure Vessel, Railway

*Revision issued annually*

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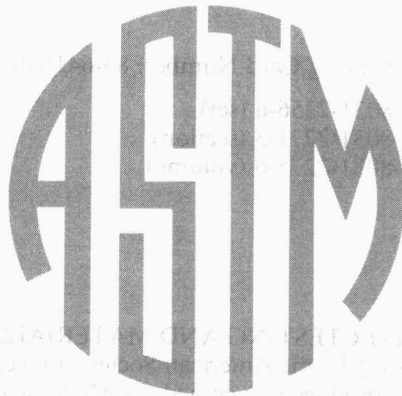


## ANNUAL BOOK OF ASTM STANDARDS

SECTION

1

### Iron and Steel Products



VOLUME

01.04

Steel—Structural, Reinforcing, Pressure  
Vessel, Railway

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*Includes standards of the following committee:*

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## Foreword

Organized in 1898, ASTM has grown into one of the largest voluntary standards development systems in the world. ASTM is a not-for-profit organization which provides a forum for producers, users, ultimate consumers, and those having a general interest (representatives of government and academia) to meet on common ground and write standards for materials, products, systems, and services.

From the work of 132 standards-writing committees, ASTM publishes more than 9,800 standards each year. These standards and other related technical information are sold throughout the world.

ASTM Headquarters has no technical research or testing facilities; such work is done voluntarily by 35,000 technically qualified ASTM members located throughout the world. Membership in the Society is open to all concerned with the fields in which ASTM is active. A membership application may be found at the back of this volume. Additional information may be obtained from Member and Committee Services, ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428; tel. (610) 832-9693.

### 1996 Annual Book of ASTM Standards

The 1996 *Annual Book of ASTM Standards* consists of 71 volumes, divided among 16 sections, of which this volume is one. It contains approved ASTM standards, provisional standards, and related material. These terms are defined as follows in the *Regulations Governing ASTM Technical Committees*:

#### Categories:

*standard*—as used in ASTM, a document that has been developed and established within the consensus principles of the Society and that meets the approval requirements of ASTM procedures and regulations.

*Discussion*—The term “standard” serves in ASTM as an adjective in the title of documents, such as test methods or specifications, to connote specified consensus and approval. The various types of standard documents are based on the needs and usages as prescribed by the technical committees of the Society.

*provisional standard*—a document published for a limited period of time by the Society to meet a demand for more rapid issuance of specific documents, such as an emergency situation, regulatory requirements, or other special circumstances.

*Discussion*—Provisional standards are not full consensus documents because they require subcommittee consensus only. (These documents replace emergency standards and proposals.)

#### Types:

The various types of ASTM documents are to provide a flexibility of form, communication, and usage for both the technical committees and the myriad users of ASTM documents. The type of ASTM document that is developed and titled is based on the technical content and intended use, not on the degree of consensus achieved. The two categories of ASTM documents (standard and provisional standard) can be of the following forms and types:

*classification*—a systematic arrangement or division of materials, products, systems, or services into groups based on similar characteristics such as origin, composition, properties, or use.

*guide*—a series of options or instructions that do not recommend a specific course of action.

*Discussion*—Whereas a practice prescribes a general usage principle, a guide only suggests an approach. The purpose of a guide is to offer guidance, based on a consensus of viewpoints, but not to establish a fixed procedure. A guide is intended to increase the awareness of the user to available techniques in a given subject area and to provide information from which subsequent evaluation and standardization can be derived.

*practice*—a definitive procedure for performing one or more specific operations or functions that does not produce a test result. (Compare *test method*.)

*Discussion*—A practice is not a downgraded test method. Examples of practices include procedures for conducting interlaboratory testing programs or other statistical procedures; for writing statements on sampling or precision and bias; and for selection, preparation, application, inspection, necessary precautions for use or disposal, installation, maintenance, and operation of testing equipment.

*specification*—a precise statement of a set of requirements to be satisfied by a material, product, system, or service that indicates the procedures for determining whether each of the requirements is satisfied.

*Discussion*—It is desirable to express the requirements numerically in terms of appropriate units together with their limits.

*terminology*—a document comprising definitions of terms; descriptions of terms; and explanations of symbols, abbreviations, or acronyms.

*test method*—a definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or service that produces a test result. (Compare *practice*.)

A new edition of the Book of Standards is published annually because of additions of new standards and significant revisions to existing standards. Approximately 30 % of each volume is new or revised. Each volume contains all actions approved by the Society at least six months before the publication date. New and revised standards approved by the Society between the annual editions of any given volume are made available as separate copies. Users are cautioned to follow the most current issue of a standard except when a specific edition of a standard is cited, for example, as in a contract.

### **Development and Use of ASTM Standards**

ASTM believes that technically competent standards result when a full consensus of all concerned parties is achieved and rigorous due process procedures are followed. This philosophy and standards development system ensure technically competent standards having the highest credibility when critically examined and used as the basis for commercial, legal, or regulatory actions.

ASTM standards are developed voluntarily and used voluntarily. Standards become legally binding only when a government body references them in regulations, or when they are cited in a contract. Any item that is produced and marked as conforming to an ASTM standard must meet all applicable requirements of that standard.

ASTM standards are used by thousands of individuals, companies, and agencies. Purchasers and sellers incorporate standards into contracts; scientists and engineers use them in laboratories; architects and designers use them in plans; government agencies reference them in codes, regulations, and laws; and many others refer to standards for guidance.

### **Consideration of Comments on ASTM Standards**

An ASTM 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 any standard or for additional standards and should be addressed to ASTM 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, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

### **Using the Annual Book of ASTM Standards**

The standards are assembled in each volume in alphanumeric sequence of their ASTM designation numbers except for Volumes 11.01, 11.02, and 05.04, which are assembled by subject matter. Volumes 03.06, 05.03, and 06.03 are assembled first by committee, then in alphanumeric sequence. Each volume has a table of contents, listing the standards in alphanumeric sequence by ASTM designation; and a list by subjects, categorizing the standards according to subject. A subject index of the standards in each volume appears at the back of each volume.

### **Availability of Individual Standards**

Each ASTM standard is available as a separate copy from ASTM. Special quantity prices and discounts can be obtained from Customer Services. When ordering, provide the ASTM standard designation and year of issue, title, quantity desired, and shipping instructions.

### **Caveat Statements and Policies in Standards**

ASTM caveat statements on Safety Hazards and Fire Hazards are required to appear in standards where appropriate. They are located in the scope section of applicable standards. The caveats on General Statement of ASTM Policy and Patents are contained in all standards and located at the end of each standard disclaimer. For more information on the caveats see Section F2 of the *Form and Style for ASTM Standards*.



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STEEL RAILS, WHEELS, AND TIRES

A complete Subject Index begins on p. 531

Since the standards in this volume are arranged in alphanumeric order, no page numbers are given in this list by subjects. The standards listed in italics are related documents included for information only and do not appear in this volume.

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§A 615/A 615M - 95b	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

§ Approved for use by agencies of the Department of Defense and, if indicated on the standard, replaces corresponding Federal or Military document. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

† Adopted by or under consideration for adoption by the Boiler and Pressure Vessel Committee of the American Society of Mechanical Engineers. The ASME Boiler and Pressure Vessel Code Specifications are identical with or based upon these ASTM Specifications.

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## 1996 ANNUAL BOOK OF ASTM STANDARDS, VOLUME 01.04

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§ Approved for use by agencies of the Department of Defense and, if indicated on the standard, replaces corresponding Federal or Military document. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

† Adopted by or under consideration for adoption by the Boiler and Pressure Vessel Committee of the American Society of Mechanical Engineers. The ASME Boiler and Pressure Vessel Code Specifications are identical with or based upon these ASTM Specifications.

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## Standard Specification for Carbon Steel Tee Rails<sup>1</sup>

This standard is issued under the fixed designation A 1; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.*

### 1. Scope

1.1 This specification covers carbon steel tee rails of nominal weights of 60 lb/yd (29.8 kg/m) and over for use in railway track, including export and industrial applications.

1.2 Supplementary requirements S1 through S3 shall apply only when specified by the purchaser in the order.

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 for<sup>2</sup>

E 10 Test Method for Brinell Hardness of Metallic Materials<sup>3</sup>

E 127 Practice for Fabricating and Checking Aluminum Alloy Ultrasonic Standard Reference Blocks<sup>4</sup>

E 428 Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Inspection<sup>4</sup>

#### 2.2 Military Standards:

MIL-STD-129 Marking for Shipment and Storage<sup>5</sup>

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage<sup>5</sup>

#### 2.3 Federal Standard:

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)<sup>5</sup>

#### 2.4 American Railway Engineering Association (AREA) Manual for Railway Engineering:

Specifications for Steel Rails, Chapter 4, Part 2<sup>6</sup>

### 3. Ordering Information

3.1 Orders for rails under this specification shall include the following information:

3.1.1 ASTM designation and year of issue.

3.1.2 Quantity (tons or pieces as appropriate).

3.1.3 Full identification of section with dimensional drawing, if required.

3.1.4 Arrangement of drilled bolt holes, if any, with dimensional drawing, if required.

3.1.5 Quantity of right-hand and left-hand (Note 1) drilled rails, drilled both-end rails, and undrilled (blank) rails desired.

3.1.6 Supplementary requirements that shall apply (see S1 through S3).

3.1.7 Disposition of various classifications of rails (see 8.4.6 and 8.4.7).

NOTE 1—The right-hand or left-hand end of the rail is determined by facing the side of the rail on which the brand (raised characters) appears.

### 4. Materials and Manufacture

4.1 *Melting Practice*—The steel shall be made by any of the following processes: open-hearth, basic-oxygen, or electric-furnace.

4.1.1 The steel shall be cast by a continuous process, in hot-topped ingots, or by other methods agreed upon by the purchaser and the manufacturer.

4.2 *Discard*—Sufficient discard shall be taken from the bloom or ingot to ensure freedom from injurious segregation and pipe.

#### 4.3 Hydrogen Elimination:

##### 4.3.1 Applicability:

4.3.1.1 Rails 60 through 70 lb/yd (29.8 through 34.8 kg/m) are not subject to treatment for hydrogen elimination.

4.3.1.2 Rails over 70 through 84 lb/yd (over 34.8 through 41.7 kg/m) may be subjected to treatment for hydrogen elimination at the option of the manufacturer.

4.3.1.3 Rails over 84 lb/yd (41.7 kg/m) shall be processed by methods that prevent the formation of shatter cracks as agreed upon by the purchaser and the manufacturer. Acceptable methods include control cooling of the rails or blooms, or vacuum treatment of the molten steel.

4.3.2 *Rail Control-Cooling Procedure* (AREA Specifications for Steel Rails)<sup>7</sup>—Rails shall be control-cooled in accordance with the following procedure, except when produced from vacuumdegassed steel or control-cooled blooms, in which case the rails may be air-cooled, and 4.3.2.1 through 4.3.2.7 are not applicable.

4.3.2.1 All rails shall be cooled on the hot beds or runways until full transformation is accomplished and then charged immediately into the containers. In no case should the rail be charged at a temperature below 725°F (385°C).

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.01 on Steel Rails and Accessories.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 01.05.

<sup>3</sup> Annual Book of ASTM Standards, Vol 03.01.

<sup>4</sup> Annual Book of ASTM Standards, Vol 03.03.

<sup>5</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Attn: NPODS.

<sup>6</sup> Available from American Railway Engineering Assn., 50 F St. NW, Washington, DC 20001.

<sup>7</sup> Adapted from AREA Specifications for Steel Rails (see 2.4).