



Foreword

Founded in 1898, ASTM International has grown into a globally recognized leader in the development and delivery of international voluntary consensus standards. Today, over 12,500 ASTM standards are used around the world to improve product quality, enhance safety, facilitate market access and trade, and build consumer confidence.

Through 140 technical standards-writing committees, ASTM serves many diverse industries providing 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. These standards and other related technical information are accepted and used throughout the world.

ASTM International Headquarters has no technical research or testing facilities; leadership in international standards development is driven by the contributions of its members: more than 30,000 of the world's top technical experts and business professionals representing 135 countries. Membership in the Society is open to all concerned with the fields in which ASTM International is active. To join ASTM, visit the website, www.astm.org under *Membership* or contact Member Services and Promotion, ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken PA 19428-2959; tel. 610-832-9535.

2010 Annual Book of ASTM Standards

The 2010 *Annual Book of ASTM Standards* consists of 82 volumes, divided among 16 sections, of which this volume is one. It contains approved ASTM 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.

standard—as used in ASTM, a descriptive used in titles of test methods, specifications, and other documents to indicate consensus approval in accordance with ASTM procedures and regulations.

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. ASTM standards 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—an organized collection of information or series of options that does not recommend a specific course of action.

Discussion—A guide increases the awareness of information and approaches in a given subject area.

practice—a set of instructions for performing one or more specific operations that does not produce a test result.

Discussion—Examples of practices include, but are not limited to: application, assessment, cleaning, collection, decontamination, inspection, installation, preparation, sampling, screening, and training.

specification—an explicit set of requirements to be satisfied by a material, product, system, or service.

Discussion—Examples of specifications include, but are not limited to, requirements for: physical, mechanical, or chemical properties, and safety, quality, or performance criteria. A specification identifies the test methods for

FOREWORD

determining whether each of the requirements is satisfied.

terminology—a document composed of terms, definitions of terms, descriptions of terms, nomenclature, and explanations of abbreviations, acronyms, and symbols.

test method—a definitive procedure that produces a test result.

Discussion—Examples of test methods include, but are not limited to: identification, measurement, and evaluation of one or more qualities, characteristics, or properties. A precision and bias statement shall be reported at the end of a test method. (See *Form and Style for ASTM Standards*, Section A21, Precision and Bias.)

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. New and revised standards approved by the Society between the annual editions of any given volume are made available on www.astm.org 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 International believes that technically competent standards result when a full consensus of all concerned parties is achieved and 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.

Citing Standards

When citing ASTM standards in other sources, the following format may be used: ASTM Standard C33, "Specification for Concrete Aggregates," ASTM International, West Conshohocken, PA, 2008, DOI: 10.1520/C33-08, www.astm.org. 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.

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 the development of new 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 your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

Using the Annual Book of ASTM Standards

The standards are assembled in each volume in alphanumeric sequence of their ASTM designation numbers. Volumes 05.05, 05.06, and 06.04 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 International. Standards can be downloaded or ordered directly from the ASTM website at www.astm.org. Standards can also be ordered from Customer Services at 610-832-9585, Monday through Friday, 8:30 AM to 4:30 PM Eastern Standard Time.

FOREWORD

Withdrawn standards shall be listed in the contents of the pertinent volumes of the *Annual Book of ASTM Standards* for three years. A single page for each standard will appear in those volumes providing the title, scope information, former committee jurisdiction, reason for withdrawal, any replacement, and the date of withdrawal. Standards that have been withdrawn may be separately available from the ASTM web site.

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. For more information on the caveats see Section F2 of the *Form and Style for ASTM Standards*.