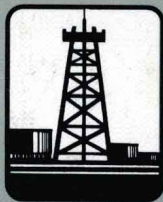


# 1996



## ANNUAL BOOK OF ASTM STANDARDS

SECTION

**5**

Petroleum Products, Lubricants,  
and Fossil Fuels



VOLUME

**05.03**

**Petroleum Products and Lubricants (III):  
D 4636 – latest; Catalysts**

*Revision issued annually*



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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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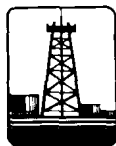
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- D 4048 – 91 Copper Corrosion from Lubricating Grease by the Copper Strip Tarnish Test
- D 1743 – 94 Corrosion Preventive Properties of Lubricating Greases
- §D 1404 – 94 Deleterious Particles in Lubricating Grease, Estimation of
- §D 1298 – 85 (1990)<sup>€1</sup> Density, Relative Density (Specific Gravity) or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- §D 566 – 93 Dropping Point of Lubricating Grease
- D 2265 – 94a Dropping Point of Lubricating Grease Over Wide Temperature Range
- §D 972 – 91<sup>€1</sup> Evaporation Loss of Lubricating Greases and Oils
- §D 2595 – 90 Evaporation Loss of Lubricating Greases Over Wide-Temperature Range
- D 5800 – 95 Evaporation Loss of Lubrication of Oils by the Noack Method
- D 2596 – 93 Extreme-Pressure Properties of Lubricating Grease (Four-Ball Method), Measurement of
- D 2509 – 93 Extreme Pressure Properties of Lubricating Grease (Timken Method), Measurement of
- D 5706 – 95 Extreme Pressure Properties of Lubricating Greases Using a High-Frequency, Linear Oscillation (SRV) Test Machine, Determining
- D 4170 – 93 Fretting Wear Protection by Lubricating Greases
- D 5707 – 95 Friction and Wear Properties of Lubricating Grease Using a High-Frequency, Linear Oscillation (SRV) Test Machine, Measuring
- §D 287 – 92 Gravity, API, of Crude Petroleum and Petroleum Products (Hydrometer Method)
- D 3337 – 91 Greases in Small Bearings, Evaluation of
- §D 1263 – 94 Leakage Tendencies of Automotive Wheel Bearing Greases
- D 4290 – 94 Leakage Tendencies of Automotive Wheel Bearing Grease Under Accelerated Conditions
- D 3527 – 95 Life Performance of Automotive Wheel Bearing Grease
- D 3340 – 90 (1995)<sup>€1</sup> Lithium and Sodium in Lubricating Greases by Flame Photometer
- D 1478 – 91 Low-Temperature Torque of Ball Bearing Greases
- D 4693 – 95 Low-Temperature Torque of Grease-Lubricated Wheel Bearings
- §D 128 – 94a Lubricating Grease, Analysis of
- D 5483 – 93 Lubricating Grease, Oxidation Induction Time of, by Pressure Differential Scanning Colorimetry
- §D 974 – 95 Number, Acid and Base, by Color-Indicator Titration
- §D 664 – 89 Number, Acid by Potentiometric Titration
- D 4425 – 90 Oil Separation from Lubricating Grease by Centrifuging (Koppers Method)
- §D 1742 – 94 Oil Separation from Lubricating Grease During Storage
- §D 942 – 90 Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method
- D 3336 – 91 Performance Characteristics of Lubricating Greases in Ball Bearings at Elevated Temperatures
- §D 1831 – 94<sup>€1</sup> Roll Stability of Lubricating Grease
- §D 1748 – 83 (1993)<sup>€1</sup> Rust Protection by Metal Preservatives in the Humidity Cabinet
- §D 1092 – 93 Viscosity, Apparent, of Lubricating Greases
- D 4056 – 92 Water, Solubility, in Hydrocarbon and Aliphatic Ester Lubricants
- D 4049 – 93 Water Spray, Resistance of Lubricating Grease, Determining the
- §D 1264 – 93 Water Washout Characteristics of Lubricating Greases, Determining the
- D 4172 – 94 Wear Preventive Characteristics, Lubricating Fluid (Four-Ball Method)
- §D 2266 – 91 Wear Preventive Characteristics of Lubricating Grease (Four-Ball Method)
- D 3704 – 90 Wear Preventive Properties of Lubricating Greases Using the (Falex) Block and Ring Test Machine in Oscillating Motion

### Lubricating Oils, Cutting Oils, Turbine Oils

### *Classification for:*

- D 2422 – 86 (1993)<sup>€1</sup> Viscosity System for Industrial Fluid Lubricants

### *Guides and Practices for:*

- D 4241 – 92 Design of Gas Turbine Generator Lubricating Oil Systems
- D 4248 – 92 Design of Steam Turbine Generator Oil Systems
- D 4378 – 92 In-Service Monitoring of Mineral Turbine Oils for Steam and Gas Turbines
- D 4871 – 88 Universal Oxidation/Thermal Stability Test Apparatus
- §D 2161 – 93 Viscosity, Conversion of Kinematic to Saybolt Universal Viscosity or to Saybolt Furol Viscosity
- §D 2270 – 93 Viscosity Index from Kinematic Viscosity at 40 and 100°C, Calculating

### *Specifications for:*

- D 4485 – 94 Automotive Engine Oils
- D 4681 – 87 Lubricants for Two-Stroke-Cycle Spark-Ignition Gasoline Engines (TSC-4)
- D 4859 – 88 (1994)<sup>€1</sup> Lubricants for Two-Stroke-Cycle Spark-Ignition Gasoline Engines—TC
- D 4304 – 93 Mineral Lubricating Oil Used in Steam or Gas Turbines
- D 4682 – 87 Miscibility with Gasoline and Fluidity of Two-Stroke-Cycle Gasoline Engine Lubricants
- D 5760 – 95<sup>€1</sup> Performance of Manual Transmission Gear Lubricants
- D 4293 – 83 (1993) Phosphate Ester Based Fluids for Turbine Lubrication