



Standard Test Methods for Solid Filling and Treating Compounds Used for Electrical Insulation¹

This standard is issued under the fixed designation D176; 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.

1. Scope*

1.1 These test methods cover physical and electrical tests for solid filling and treating compounds used for electrical insulation which are fusible to a liquid without significant chemical reaction. Compounds that are converted to the solid state by polymerization, condensation, or other chemical reaction are not included in these test methods.

1.2 These test methods are designed primarily for asphaltic or bituminous compounds, waxes, and fusible resins, or mixtures thereof, although some of these methods are applicable to semisolid types such as petrolatums. Special methods more suitable for hydrocarbon waxes are contained in Test Methods **D1168**.

1.3 Provide adequate ventilation when these tests involve heating.

1.4 The test methods appear in the following sections:

Test Method	Sections
<i>Electrical Tests:</i>	
A-C Loss Characteristics and Permittivity (Dielectric Constant)	51-54
Dielectric Strength	42-45
Volume Resistivity-Temperature Characteristics	46-49
<i>Physical Tests:</i>	
Coefficient of Expansion or Contraction	22-41
Flash and Fire Points	9 and 10
Loss on Heating	11 and 12
Melting Point	5 and 6
Penetration	15 and 16
Softening Point	7 and 8
Specific Gravity	17-21
Viscosity	13 and 14

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use. For specific hazard statements, see **12.1** and **31.5**.

NOTE 1—There is no similar or equivalent IEC or ISO standard.

2. Referenced Documents

2.1 ASTM Standards:²

- D5** Test Method for Penetration of Bituminous Materials
- D6** Test Method for Loss on Heating of Oil and Asphaltic Compounds
- D70** Test Method for Density of Semi-Solid Bituminous Materials (Pycnometer Method)
- D71** Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)
- D88** Test Method for Saybolt Viscosity
- D92** Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- D127** Test Method for Drop Melting Point of Petroleum Wax, Including Petrolatum
- D149** Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
- D150** Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation
- D257** Test Methods for DC Resistance or Conductance of Insulating Materials
- D937** Test Method for Cone Penetration of Petrolatum
- D1168** Test Methods for Hydrocarbon Waxes Used for Electrical Insulation
- D1711** Terminology Relating to Electrical Insulation
- E28** Test Methods for Softening Point of Resins Derived from Naval Stores by Ring-and-Ball Apparatus
- E102** Test Method for Saybolt Furol Viscosity of Bituminous Materials at High Temperatures

3. Terminology

3.1 Definitions:

¹ These methods of testing are under the jurisdiction of ASTM Committee **D09** on Electrical and Electronic Insulating Materials and are the direct responsibility of Subcommittee **D09.01** on Electrical Insulating Varnishes, Powders and Encapsulating Compounds.

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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.

*A Summary of Changes section appears at the end of this standard