



Standard Test Methods for Laminated Round Rods Used for Electrical Insulation¹

This standard is issued under the fixed designation D349; 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 the procedures for testing rigid round rods used in electrical insulation. These round rods include many types made from fibrous sheets of basic materials, such as cellulose, glass, or nylon in the form of paper, woven fabrics, or mats, bonded together by natural or synthetic resins, or by adhesives. Such round rods include vulcanized fiber and thermosetting laminates as well as round rods made from cast, molded, or extruded natural or synthetic resins, with or without fillers or reinforcing materials.

1.2 The procedures appear in the following sections:

	Section
Compressive strength (axial)	20 – 25
Density	28 – 30
Dielectric strength	31 – 39
Flexural strength	13 – 19
Tensile strength	7 – 12
Water absorption	26-27

1.3 The values stated in inch-pound units are to be regarded as the standard.

1.4 *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 appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For a specific warning statement see 36.2.

2. Referenced Documents

2.1 ASTM Standards:²

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

D570 Test Method for Water Absorption of Plastics

D668 Test Methods of Measuring Dimensions of Rigid Rods and Tubes Used for Electrical Insulation

¹ These test methods are under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and are the direct responsibility of Subcommittee D09.07 on Flexible and Rigid Insulating Materials.

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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.

D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

D1711 Terminology Relating to Electrical Insulation

D6054 Practice for Conditioning Electrical Insulating Materials for Testing (Withdrawn 2012)³

3. Terminology

3.1 *Definitions*—Use Terminology **D1711** for definitions of terms used in these test methods and associated with electrical or electronic insulation materials.

4. Selection of Test Specimens

4.1 Specimens for tests shall be selected from portions of material that are free of obvious defects unless the purpose of the test is to evaluate the effect of these defects.

5. Conditioning

5.1 In order to eliminate the effects of previous history of humidity exposure and to obtain reproducible results (**Note 1**), in all cases of dispute give the test specimens of laminated rods a conditioning treatment for physical test as follows:

5.1.1 *Tensile, Flexural, and Compressive Strengths, and Density*—Prior to test, condition the machined specimens in accordance with Procedure B of Practice **D6054**. All specimens shall be tested at room temperature maintained at 23 ± 5 °C.

NOTE 1—The following are potential reasons to undertake conditioning of specimens: (a) for the purpose of bringing the material into equilibrium with normal or average room conditions of 23 °C and 50 % relative humidity; (b) simply to obtain reproducible results, irrespective of previous history of exposure; or (c) to subject the material to abnormal conditions of temperature or humidity in order to predict its service behavior.

The conditions given here to obtain reproducible results will give physical values which could be somewhat higher or somewhat lower than values under equilibrium at normal conditions, depending upon the particular material and test. To ensure substantial equilibrium under normal conditions of humidity and temperature, however, will require from 20 to 100 days or more depending upon thickness and type of material and its previous history. Consequently, conditioning for reproducibility must of necessity be used for general purchase specifications and product control tests.

³ The last approved version of this historical standard is referenced on www.astm.org.