



Standard Test Methods for Fully Cured Silicone Rubber-Coated Glass Fabric and Tapes for Electrical Insulation¹

This standard is issued under the fixed designation D1458; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 These test methods cover procedures for testing fully cured silicone rubber-coated glass fabric and tapes to be used for electrical insulation.

1.2 The procedures appear in the following order:

Procedure	ASTM	
	Sections	References
Breaking Strength	7	D828
Breaking Strength After Creasing	8	...
Conditioning	5	...
Dielectric Breakdown Voltage	9	D149, D295, D6054
Dielectric Proof-Voltage	10	D1389
Dissipation Factor and Relative Permittivity	11	D150
Sampling	4	...
Thermal Endurance	15	D1830
Thickness	6	D374
Thread Count	14	...
Volume Resistivity	12	D257
Weight	13	...

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.

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. See 9.5.1 for a specific warning statement.*

2. Referenced Documents

2.1 ASTM Standards:²

D149 Test Method for Dielectric Breakdown Voltage and

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.

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

D202 Test Methods for Sampling and Testing Untreated Paper Used for Electrical Insulation

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

D295 Test Methods for Varnished Cotton Fabrics Used for Electrical Insulation

D374 Test Methods for Thickness of Solid Electrical Insulation (Withdrawn 2013)³

D828 Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus (Withdrawn 2009)³

D1389 Test Method for Proof-Voltage Testing of Thin Solid Electrical Insulating Materials (Withdrawn 2013)³

D1711 Terminology Relating to Electrical Insulation

D1830 Test Method for Thermal Endurance of Flexible Sheet Materials Used for Electrical Insulation by the Curved Electrode Method

D5032 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Glycerin Solutions

D6054 Practice for Conditioning Electrical Insulating Materials for Testing (Withdrawn 2012)³

E104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions

3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, see Terminology D1711.

4. Sampling

4.1 Sample shipments of material as specified below, and where possible take only one sample from any package.

4.1.1 *Fabric*—Over 3 in. (75 mm) in width.

4.1.1.1 *Rolls*—Select one roll from each ten rolls or fraction thereof in a shipment of full-width fabric. Cut off not less than

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

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

two turns of fabric from each roll selected from sampling, and select sample material for the preparation of test specimens from the remaining layers of the roll.

4.1.1.2 Sheets—Select one sheet from each 50 sheets or fraction thereof in a shipment of sheeted fabric. Remove not less than six sheets from the outer layers of each package of sheets selected from sampling, and then select sample material for the preparation of test specimens from the remaining sheets.

4.1.2 Tapes and Strips—3 in. (75 mm) and less in width.

4.1.2.1 Tapes—Cut off not less than six turns of tape from each roll selected for sampling, and then select sample material for the preparation of test specimens from the remaining layers of the roll. Select rolls of tape in accordance with the following schedule:

Number of Rolls in Shipment	Minimum Number of Sample Rolls
Over 10 000	1 per 1000
5001 to 10 000	10
2001 to 5000	5
Less than 2000	2

4.1.2.2 Strips—Select three strips from each 100 strips or fraction thereof in a shipment of strips. Remove not less than six strips from the outer layers of each package of strips selected for sampling, and then select sample material for the preparation of test specimens from the remaining strips.

4.2 Prepare the test specimens from samples selected as specified in **4.1**, and as provided for in the individual test methods.

5. Conditioning

5.1 Significance and Use—The properties of the material described in these test methods are affected by the temperature and moisture content of the material to a greater or lesser extent, depending on the specific property.

5.2 Conditioning—Unless otherwise specified in the individual test method, condition test specimens as described in **5.2.1** or **5.2.2**, and in matters of dispute, consider **5.2.1** as the referee method.

5.2.1 Condition the test specimens for 48 h in the Standard Laboratory Atmosphere of $50 \pm 2\%$ relative humidity at a temperature of $23 \pm 1^\circ\text{C}$ ($73.4 \pm 1.8^\circ\text{F}$), and conduct the tests under these conditions.

5.2.2 Condition the test specimens for 48 h in the Standard Laboratory Atmosphere of $50 \pm 2\%$ relative humidity at a temperature of $23 \pm 1^\circ\text{C}$ ($73.4 \pm 1.8^\circ\text{F}$), and conduct the tests immediately upon removal of the specimens from the conditioning room or chamber.

6. Thickness

6.1 Significance and Use:

6.1.1 The importance of space factor in the design of electrical equipment makes proper determination of thickness essential.

6.1.2 Some properties, such as dielectric strength and dielectric breakdown, vary with the thickness of the material, and

certain properties, such as thermal conductivity and dielectric constant, cannot be determined without a knowledge of thickness.

6.2 Test Specimens—Cut specimens prepared from fabric samples 1 in. (25 mm) wide across the entire width of the fabric, while specimens prepared from tape and strip samples shall be the width of the sample and 36 in. (910 mm) long. Where the specimen is 36 in. or longer (full-width fabric 36 in. or more in width, or where the length of a strip is 36 in. or longer), only one specimen will be required unless otherwise specified. Where the specimen is less than 36 in. (full-width fabric less than 36 in. wide, or strips less than 36 in. long), as many specimens as are needed to obtain the equivalent 36 in. linear measure will be required.

6.3 Conditioning—It is not necessary to condition the specimens for this test. Conduct tests at the Standard Laboratory Temperature of $23 \pm 1^\circ\text{C}$ ($73.4 \pm 1.8^\circ\text{F}$).

6.4 Procedure—Make ten measurements, equally spaced along 36 in. (910 mm) of the specimen or specimens in accordance with Method C of Test Methods **D374** modified as follows:

6.4.1 Allow the presser foot to remain on the test specimen for 2 s, at the end of which read the dial gage.

6.4.2 Use a presser foot 0.250 in. (6.35 mm) in diameter, and an anvil surface upon which the specimen rests at least 2 in. (51 mm) in diameter. The force exerted on the specimen shall be 3 ozf (85 g).

6.4.3 Method C is not considered interchangeable with Method A.

6.5 Report—Report the average, maximum, and minimum thickness to the nearest 0.0001 in. (0.003 mm).

7. Breaking Strength

7.1 Significance and Use—The breaking strength of finished fabric or tape is of importance as a measure of the tension it will withstand without failure while being applied in service.

7.2 Apparatus—Use a power-driven tensile testing machine meeting the requirements specified for Tensile Properties in Test Methods **D202**, except that the means for determining elongation and for recording applied load and elongation are not required. The machine shall be equipped with specimen-gripping devices as described in **7.2.1** or **7.2.2**.

7.2.1 Provide two flat-jawed clamps, in which case crocus cloth will be required for holding specimens between the jaws, or

7.2.2 Provide two gripping devices of the drum type as described in **Fig. 1**, in which case pins as indicated will be required for securing specimens on the cylinders.

7.3 Test Specimens—The test specimen shall be of sufficient length to provide positive gripping in the jaws with a separation of approximately 6 in. (150 mm). In the case of the flat-jawed clamps, this will require a minimum specimen length of 8 in. (200 mm) and a desirable length of 10 in. (250 mm). Where drum-type gripping devices are used, a specimen no less than 20 in. (500 mm) long will be required. Prepare the specimens from each sample as follows: