



Standard Test Method for Voltage Endurance of Solid Electrical Insulating Materials Subjected to Partial Discharges (Corona) on the Surface¹

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1. Scope

1.1 This test method differentiates among solid electrical insulating materials for use at commercial power frequencies with respect to their voltage endurance under the action of corona (see Note 1). In general, this test method is more meaningful for rating materials with respect to their resistance to prolonged a-c stress under corona conditions than is dielectric strength.

NOTE 1—The term “corona” is used almost exclusively in this test method instead of “partial discharge”, because it is a visible glow at the edge of the smaller electrode. This is a difference in location, not in kind. Partial discharges also occur at the edges of electrodes, and in general corona describes an electrical discharge irrespective of its location.

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

1.3 *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 specific hazard statements, see Section 7.

2. Referenced Documents

2.1 ASTM Standards:

- D 149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies²
- D 1711 Terminology Relating to Electrical Insulation²
- D 1868 Test Method for Detection and Measurement of Partial Discharge (Corona) Pulses in Evaluation of Insulation Systems²
- D 5032 Practice for Maintaining Constant Relative Humid-

ity by Means of Aqueous Glycerin Solutions³

D 6054 Practice for Conditioning Electrical Insulating Materials for Testing⁴

E 41 Terminology Relating to Conditioning⁴

E 104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions⁵

E 171 Specification for Standard Atmospheres for Conditioning and Testing Flexible Barrier Materials⁶

2.2 Special Technical Publications:

Symposium on Corona, STP 198, ASTM, 1956.⁷

Corona Measurement and Interpretation, Engineering Dielectrics, Vol 1, STP 669, ASTM, 1979.⁷

2.3 International Electrotechnical Commission (IEC) Documents:

IEC Publication 60343 Recommended test methods for determining the relative resistance of insulating materials to breakdown by surface discharges⁸

2.4 Institute of Electrical and Electronic Engineers (IEEE) Document:

IEEE SS 11205-TBR Guide for the Statistical Analysis of Electrical Insulation Voltage Endurance Data, 1987⁹

3. Terminology

3.1 For definitions of other terms used in this standard, refer to Terminology D 1711 and Test Method D 1868.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *threshold voltage*—That voltage below which failure will not occur under the test conditions irrespective of the duration of the test.

3.2.1.1 *Discussion*—Demonstration of a threshold is difficult when the slope of a volt-time curve is small, and failure times are long. High frequency tests are often an aid in

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² *Annual Book of ASTM Standards*, Vol 10.01.

³ *Annual Book of ASTM Standards*, Vol 10.02.

⁴ *Annual Book of ASTM Standards*, Vol 14.04.

⁵ *Annual Book of ASTM Standards*, Vol 11.03.

⁶ *Annual Book of ASTM Standards*, Vol 15.09.

⁷ Available from ASTM Headquarters, 1916 Race St., Philadelphia, PA 19103.

⁸ Available from American National Standards Institute, 11 West 42nd St., 13th Floor, New York, NY 10036.

⁹ Available from IEEE Headquarters, 345 East 47th St., New York, NY 10017.

