



Standard Test Methods for Adhesives Relative to Their Use as Electrical Insulation¹

This standard is issued under the fixed designation D 1304; 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 procedures for testing adhesives in liquid, highly viscous, solid, or set states, that are intended to be cured by electronic heating, or that are intended to provide electrical insulation, or that are intended for use in electrical apparatus.

1.2 The procedures appear in the following order:

(1) *Procedure for Testing Adhesives Before Use:*

	Section
Power Factor and Dielectric Constant of Liquid Adhesives	7
Direct-Current Conductivity	8
Extract Conductivity	9
Acidity and Alkalinity	10
pH Value	11

(2) *Procedures for Testing Properties of Adhesives As Used:*

	Section
Power Factor and Dielectric Constant of a Dried or Cured Adhesive	
Film	12
Dielectric Strength	13
Volume and Surface Resistivity	14
Arc Resistance	15

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 a specific hazard statement, see 8.2.*

2. Referenced Documents

2.1 ASTM Standards:

- D 115 Test Methods for Testing Solvent Containing Varnishes Used for Electrical Insulation²
- D 150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation²
- D 202 Test Methods for Sampling and Testing Untreated Paper Used for Electrical Insulation²
- D 257 Test Methods for DC Resistance or Conductance of Insulating Materials²
- D 495 Test Method for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation²

D 897 Test Method for Tensile Properties of Adhesive Bonds³

D 907 Terminology of Adhesives³

3. Terminology

3.1 *Definitions*—Many terms in these test methods are defined in Terminology D 907.

4. Significance and Use

4.1 Insulating materials are used to isolate components of an electrical system from each other and from ground, as well as to provide mechanical support for the components. For this purpose, it is generally desirable to have the insulation resistance as high as possible, consistent with acceptable mechanical, chemical, and heat-resisting properties. Since insulation resistance or conductance combines both volume and surface resistance or conductance, its measured value is most useful when the test specimen and electrodes have the same form as is required in actual use. Surface resistance or conductance changes rapidly with humidity, while volume resistance or conductance changes slowly although the final change may eventually be greater.

4.2 Resistivity or conductivity is used to predict, indirectly, the low-frequency dielectric breakdown and dissipation factor properties of some materials. Resistivity or conductivity is often used as an indirect measure of moisture content, degree of cure, mechanical continuity, and deterioration of various types. The usefulness of these indirect measurements is dependent on the degree of correlation established by supporting theoretical or experimental investigations. A decrease of surface resistance will result either in an increase of the dielectric breakdown voltage because the electric field intensity is reduced, or a decrease of the dielectric breakdown voltage because the area under stress is increased.

4.3 All the dielectric resistances or conductances depend on the length of time of electrification and on the value of applied voltage (in addition to the usual environmental variables). These must be known to make the measured value of resistance or conductance meaningful.

4.4 Volume resistivity or conductivity is used as an aid in designing an insulator for a specific application. The change of resistivity or conductivity with temperature and humidity may be great, and must be known when designing for operating

¹ These test methods are under the jurisdiction of ASTM Committee D-14 and are the direct responsibility of Subcommittee D14.80 on Metal Bonding Adhesives. Current edition approved May 10, 1999. Published August 1999. Originally published as D 1304 – 54. Last previous edition D 1304 – 93.

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

³ *Annual Book of ASTM Standards*, Vol 15.06.