



Standard Test Methods for DC Resistance or Conductance of Insulating Materials¹

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

1. Scope

1.1 These test methods cover direct-current procedures for the determination of dc insulation resistance, volume resistance, volume resistivity, surface resistance, and surface resistivity of electrical insulating materials, or the corresponding conductances and conductivities.

1.2 These test methods are not suitable for use in measuring the electrical resistivity/conductivity of moderately conductive materials. Use Test Method D 4496 to evaluate such materials.

1.3 The test methods and procedures appear in the following sections:

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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 hazard statement, see 6.1.8.

2. Referenced Documents

2.1 ASTM Standards:

D 150 Test Methods for AC Loss Characteristics and Permittivity Dielectric Constant of Solid Electrical Insulation²
D 374 Test Methods for Thickness of Solid Electrical Insulation²

D 618 Practice for Conditioning Plastics for Testing³

D 1169 Test Method for Specific Resistance (Resistivity) of Electrical Insulating Liquids⁴

D 1711 Terminology Relating to Electrical Insulation²

D 4496 Test Method for DC Resistance or Conductance of Moderately Conductive Materials⁵

D 5032 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Glycerin Solutions⁵

E 104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions⁶

3. Terminology

3.1 *Definitions*—The following definitions are taken from Terminology D 1711 and apply to the terms used in these test methods.

3.1.1 *conductance, insulation, n*—the ratio of the total volume and surface current between two electrodes (on or in a specimen) to the dc voltage applied to the two electrodes.

3.1.1.1 *Discussion*—Insulation conductance is the reciprocal of insulation resistance.

3.1.2 *conductance, surface, n*—the ratio of the current between two electrodes (on the surface of a specimen) to the dc voltage applied to the electrodes.

3.1.2.1 *Discussion*—(Some volume conductance is unavoidably included in the actual measurement.) Surface conductance is the reciprocal of surface resistance.

3.1.3 *conductance, volume, n*—the ratio of the current in the volume of a specimen between two electrodes (on or in the specimen) to the dc voltage applied to the two electrodes.

¹ These test methods are under the jurisdiction of ASTM Committee D-9 on Electrical and Electronic Insulating Materials and are the direct responsibility of Subcommittee D09.12 on Electrical Tests.

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

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 10.03.

⁵ *Annual Book of ASTM Standards*, Vol 10.02.

⁶ *Annual Book of ASTM Standards*, Vol 11.03.