



Standard Test Method for Longitudinal Measurement of Volume Resistivity for Extruded Crosslinked and Thermoplastic Semiconducting Conductor and Insulation Shielding Materials¹

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1. Scope*

1.1 This test method covers the procedure for determining the volume resistivity, measured longitudinally, of extruded crosslinked and thermoplastic semiconducting, conductor and insulation shields for wire and cable.

1.2 In common practice the conductor shield is often referred to as the strand shield.

1.3 Technically, this test method is the measurement of a resistance between two electrodes on a single surface and modifying that value using dimensions of the specimen geometry to calculate a resistivity. However, the geometry of the specimen is such as to support the assumption of a current path primarily throughout the volume of the material between the electrodes, thus justifying the use of the term “longitudinal volume resistivity.” (See 3.1.2.1)

1.4 Whenever two sets of values are presented, in different units, the values in the first set are the standard, while those in parentheses are for information only.

1.5 *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 7.1.

2. Referenced Documents

2.1 ASTM Standards:²

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

¹ This test method is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.18 on Solid Insulations, Non-Metallic Shieldings and Coverings for Electrical and Telecommunication Wires and Cables.

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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.

D1711 Terminology Relating to Electrical Insulation
D4496 Test Method for D-C Resistance or Conductance of Moderately Conductive Materials

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *semiconducting, adj*—moderately conductive, see Terminology D1711 and Test Method D4496.

3.1.2 *longitudinal volume resistivity, n*—an electrical resistance multiplied by a factor calculated from the geometry of a specimen volume between electrodes in contact with one, and only one, surface of the specimen.

3.1.2.1 *Discussion*—In normal wire and cable usage, the longitudinal volume resistivity is simply referred to as “volume resistivity.” This usage is at variance with terminology in Test Methods D257, Terminology D1711, and Test Method D4496.

4. Significance and Use

4.1 The electrical behavior of semiconducting extruded shielding materials is important for a variety of reasons, such as safety, static charges, and current transmission. This test method is useful in predicting the behavior of such semiconducting compounds. Also see Test Method D4496.

5. Apparatus

5.1 See Test Method D4496 for a description of the apparatus, except the electrode system which is described in 7.2.

6. Sampling and Test Specimens

6.1 Take one 2-ft (600-mm) sample from each lot, or from each 25000 ft (7600 m) of completed cable, whichever is less.

6.2 The specimen consists of a 10 in. (250 mm) length of cable core with all layers external to the semi-conducting insulation shield removed. Use this specimen to test the insulation shield. To test the conductor shield, bisect the sample longitudinally and remove the conductor. Use only one piece of the conductor shield as the test specimen.

6.3 Condition the specimens in accordance with Test Method D4496.

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