



Standard Test Method for 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 of extruded crosslinked and thermoplastic semiconducting, conductor and insulation shields for wire and cable.

1.2 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.

1.3 *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 7.1.

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

1.5 While technically the volume resistivity in this test method is a longitudinal volume resistivity, in the wire and cable industry the word longitudinal is not used.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1711 Terminology Relating to Electrical Insulation²

D 4496 Test Method of DC-Resistance or Conductance of Moderately Conductive Materials³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *semiconducting*, *adj*—moderately conductive, see Terminology **D 1711** and Test Method **D 4496**.

3.1.2 *longitudinal volume resistivity*, *n*— the measurement of a resistance between two electrodes attached to one and only one surface of the specimen resulting in a current path parallel to the axis of the cable and perpendicular to the plane of the electrodes.

3.1.2.1 *Discussion*—In normal wire and cable usage, the word longitudinal is not used.

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 **D 4496**.

5. Apparatus

5.1 See Test Method **D 4496** 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 **D 4496**.

6.3.1 If the shielding materials are crosslinked, condition the cable core (jacket removed) overnight at 50°C to eliminate any acetophenone that may be present. Then proceed with the conditioning in accordance with Test Method **D 4496**.

7. Procedure

7.1 **Warning**—Insert the latest version of high-voltage caveat here.

¹ This test method is under the jurisdiction of ASTM Committee D-9 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.18 on Solid Insulations, Nonmetallic Shieldings and Coverings for Electrical and Telecommunication Wires and Cables.

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

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