Designation: D3004 – 08 (Reapproved 2013)

Standard Specification for Crosslinked and Thermoplastic Extruded Semi-Conducting, Conductor and Insulation Shielding Materials[1]

This standard is issued under the fixed designation D3004; 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 This specification covers crosslinked and thermoplastic extruded semi-conducting, conductor and insulation shielding materials for electrical wires and cables.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 In many instances, the electrical properties of the shielding material are strongly dependent on processing conditions. For this reason, in this specification the material is sampled from cable. Therefore, tests are done on shielded wire in this standard solely to determine the relevant property of the shielding material and not to test the conductor or completed cable.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

D1711 Terminology Relating to Electrical Insulation

D2647 Specification for Crosslinkable Ethylene Plastics

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets

D3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products

D4496 Test Method for D-C Resistance or Conductance of Moderately Conductive Materials

D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets

D6095 Test Method for Longitudinal Measurement of Volume Resistivity for Extruded Crosslinked and Thermoplastic Semiconducting Conductor and Insulation Shielding Materials

3. Terminology

3.1 *Definitions:* For definitions of terms used in this specification, refer to Terminology D1711.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *aging (act of), n*—the exposure of materials to an environment for an interval of time.

3.2.2 *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.

3.2.2.1 *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.

3.2.3 *semi-conducting, adj*—moderately conductive; see Terminology D1711 and Test Method D4496.

4. Physical Properties

4.1 The shielding material, when processed into molded slabs, in accordance with Procedure C in the Annex of Practice D4703, the Sampling Section of Specification D2647, and Practices D3182 and D3183, depending on the type of material being tested, shall conform to the requirements for physical properties specified in Table 1.

5. Electrical Requirements

5.1 *Logitudinal Volume Resistivity*—When the extruded conductor and insulation shielding is sampled and tested in accordance with Test Method D6095, the volume resistivity at the rated temperature of the insulation shall be not greater than 100 000 Ω·cm for conductor shielding and 50 000 Ω·cm for insulation shielding.

6. Sampling

6.1 Sample the semi-conducting materials in accordance with 4.1.

[1] This specification 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.

Current edition approved Nov. 1, 2013. Published December 2013. Originally approved in 1971. Last previous edition approved in 2008 as D3004 – 08. DOI: 10.1520/D3004-08R13.

[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.

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

TABLE 1 Physical Properties for Semi-conducting Shielding Materials

Brittle point (Test Method A)	–10°C, max
Aging requirements:[A]	
Elongation at rupture, min, %	100

[A] Thermoplastic materials, aged 48 h at 100 ± 1°C. Crosslinked materials, aged 168 h at 121 ± 1°C.

7. Test Methods

7.1 Test the semi-conducting materials in accordance with 4.1 and Test Method D6095.

8. Keywords

8.1 conductor shielding material; insulation shielding material; semicon; semi-conducting shielding material; volume resistivity

SUMMARY OF CHANGES

Committee D09 has identified the location of selected changes to this specification since the last issue, D3004 – 02, that may impact the use of this specification. (Approved May 1, 2008)

(*1*) Revised the document throughout, including the title.