Designation: D2308 – 07 (Reapproved 2013)

Standard Specification for Thermoplastic Polyethylene Jacket for Electrical Wire and Cable[1]

This standard is issued under the fixed designation D2308; 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 a thermoplastic jacketing compound for 2 to 35 kV wire and cable, of at least 0.030 in. (0.76 mm) nominal thickness, consisting substantially of pigmented polyethylene.

1.2 In many instances the jacket material cannot be tested unless it has been formed around a conductor or cable. Therefore, tests done on jacketed wire and cable in this specification are solely to determine the relevant property of the jacket material and not to test the jacketed conductor or completed cable.

1.3 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.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1248 Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics

D1711 Terminology Relating to Electrical Insulation

D2633 Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable

D3349 Test Method for Absorption Coefficient of Ethylene Polymer Material Pigmented with Carbon Black

3. Terminology

3.1 *Definitions:*

3.1.1 Refer to Terminology D1711 for definitions of terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *aging, (act of), n*—exposure of materials to air at 100 °C for either 24 or 48 h.

4. Physical Properties

4.1 The polyethylene before application to the wire or cable shall comply with the requirements for Type I, Class C, Category 4 or 5, Grade E5 or J3 of Specification D1248, or Class B with equivalent weathering requirements to Class C materials. The requirements of Specification D1248 shall not apply to the jacket removed from the wire or cable. The compound is suitable for exposure to sunlight and other atmospheric environments at temperatures between −55 and +75 °C, and a minimum installation temperature of −40 °C.

4.2 Specimens removed from the wire or cable and tested at 20 to 28 °C (68 to 82 °F) shall conform to the requirements for physical properties specified in Table 1. Alternatively, the jacket shall be air-oven aged without removal from the conductor.

4.3 *Environmental Stress-Cracking Test*—The jacket shall conform to the requirements for Grade E5 as specified in Table 3 of Specification D1248.

4.4 *Absorption Coefficient*—See Test Method D3349. Instead of testing the jacket removed from the conductors, a certification by the polyethylene compound manufacturer that this requirement has been complied with shall suffice.

5. Electrical Properties

5.1 The polyethylene jacket shall conform to the requirements for electrical properties specified in Table 2.

6. Sampling

6.1 Unless otherwise instructed, sample the jacket in accordance with Test Methods D2633.

7. Test Methods

7.1 Unless otherwise instructed, test the jacket in accordance with Test Methods D2633.

7.2 *Environmental Stress-Cracking Test*— Test in accordance with Test Method D1693, Condition A, using undiluted Igepal CO 630 as specified in Specification D1248.

[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.

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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.

TABLE 1 Physical Properties

Unaged Requirements:	
Tensile Strength, min, psi (MPa)	1400 (9.7)
Elongation at Rupture, min, %	350
Aged Requirements:	
After Air oven aging at 100 ± 1 °C for 48 h (Grade E5) or 24 h (Grade J3):	
Tensile Strength, min, psi (MPa)	1050 (7.3)
Elongation at Rupture, min, %	265
Absorption Coefficient, min, absorbance/m	320
Heat Distortion at 90 ± 1 °C, max, %	25

TABLE 2 Requirements for Surface Resistivity and U-Bend Discharge

Surface Resistivity, min, MQ	200 000
U-Bend discharge at 125 V/mil (4.9 kV/mm)	No failures or cracks

7.3 *Absorption Coefficient*—Test in accordance with Test Method D3349.

8. Retest

8.1 If all of the specimens pass the test described, the lot of cable that they represent shall be considered to meet the requirements of this specification.

8.2 If any specimen fails to pass these tests, the length of cable from which the specimen was taken shall be considered as not meeting the requirements of this specification. Retest new specimens from each of two other lengths of cable from the lot of cable under test. If either of the second specimens fails to pass the test, consider the lot of cable as not meeting the requirements of this specification. If both such second specimens pass the test, consider the lot of cable (except the length represented by the first specimen) to meet the requirements of this specification.

8.3 Failure of any specimen shall not preclude resampling and retesting the length of cable from which the original specimen was taken.

9. Keywords

9.1 absorption coefficient; environmental stress-cracking; heat distortion; polyethylene jacket; surface resistance; thermoplastics PE jacket; U-bend discharge