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An American National Standard

Standard Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable[1]

This standard is issued under the fixed designation D 2633; 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 These test methods cover procedures for the testing of thermoplastic insulations and jackets used on insulated wire and cable. To determine the test to be made on the particular insulation or jacket compound, reference should be made to the product specification for that type. These test methods do not apply to the class of products known as flexible cords. The electrical tests on insulation and water-absorption tests do not apply to the class of products having a separator between the conductor and the insulation.

1.2 These test methods pertain to insulation or jacket material for electrical wires and cables. In many instances the insulation or jacket material cannot be tested unless it has been formed around a conductor or cable. Therefore, tests are done on insulated or jacketed wire or cable in these test methods solely to determine the relevant property of the insulation or jacket material and not to test the 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.

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 specific hazards see Sections 4 and 63.

1.5 The procedures appear in the following sections:

Procedure	Sections
Cold Bend Test	75 to 77
Dielectric Strength Retention Test	45 to 51
Electrical Tests of Insulation	17 to 29
Heat Distortion Test	74
Heat Shock Test	73
Insulation Resistance Test	30 to 37
Partial-Discharge Extinction Level Test	38 to 44
Physical Tests of Insulation and Jackets	5 to 16
Surface Resistivity Test	64 to 67
Thermal Tests	72 to 77
Track Resistance Test	78 to 81
U-Bend Discharge Test	68 to 71
Vertical Flame Test	63
Water Absorption Tests, Accelerated	52 to 62

2. Referenced Documents

2.1 *ASTM Standards:*

D 149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies[2]

D 150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation[2]

D 257 Test Methods for DC Resistance or Conductance of Insulation[2]

D 374 Test Methods for Thickness of Solid Electrical Insulation[2]

D 471 Test Method for Rubber Property-Effect of Liquids[3]

D 573 Test Method for Rubber-Deterioration in an Air Oven[3]

D 638 Test Method for Tensile Properties of Plastics[4]

D 1711 Terminology Relating to Electrical Insulation[2]

D 1248 Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable[4]

D 2132 Test Method for Dust-and-Fog Tracking and Erosion Resistance of Electrical Insulating Materials[2]

D 3755 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials Under Direct-Voltage Stress[5]

D 5025 Specification for a Laboratory Burner Used for Small-Scale Burning Tests on Plastic Materials[6]

D 5207 Practice for Calibration of 20 and 125 mm Test Flames for Small-Scale Burning Tests on Plastic Materials[6]

D 5423 Specification for Forced-Convection Laboratory Ovens for Evaluation of Electrical Insulation[5]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[7]

2.2 *Federal Standard:*

[1] These methods are under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and are 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] *Annual Book of ASTM Standards*, Vol 10.01.
[3] *Annual Book of ASTM Standards*, Vol 09.01.
[4] *Annual Book of ASTM Standards*, Vol 08.01.
[5] *Annual Book of ASTM Standards*, Vol 10.02.
[6] *Annual Book of ASTM Standards*, Vol 08.03.
[7] *Annual Book of ASTM Standards*, Vol 14.02.

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