



Standard Test Method for Dust-and-Fog Tracking and Erosion Resistance of Electrical Insulating Materials¹

This standard is issued under the fixed designation D 2132; 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 test method is intended to differentiate solid electrical insulating materials with respect to their resistance to the action of electric arcs produced by conduction through surface films of a specified contaminant containing moisture. Test Methods D 2302 and D 2303 may also be used to evaluate materials.

1.2 The values stated in inch-pound units are the standard, except in cases where SI units are more appropriate. The values 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.* Specific precautionary statements are given in 11.4.

NOTE 1—There is no equivalent ISO standard.

2. Referenced Documents

2.1 ASTM Standards:²

D 709 Specification for Laminated Thermosetting Materials

D 1711 Terminology Relating to Electrical Insulation

D 2302 Method of Test for Differential Wet Tracking Resistance of Electrical Insulating Materials with Controlled Water-to-Metal Discharges³

D 2303 Test Methods for Liquid-Contaminant, Inclined-Plane Tracking and Erosion of Insulating Materials

3. Terminology

3.1 Definitions:

3.1.1 For definitions pertinent to this test method see Terminology D 1711.

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 Telecommunications 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.

³ Discontinued, see 1982 *Annual Book of ASTM Standards*, Part 39.

4. Summary of Test Method

4.1 With electrodes mounted as shown in Fig. 1, coat test specimens with a synthetic dust and test in a chamber shown in Fig. 2. Direct a water spray at the test specimen. After the surface has been wetted, apply a 60-Hz voltage between the electrodes. Arcing occurs across localized high-resistance areas produced by nonuniform evaporation of the water from the contaminant. These arcs produce high temperatures in the underlying insulation with resultant carbonization of most organic materials. The carbonization concentrates the electric field. Further carbonization may occur in the direction of the field. In such cases, a carbon track is formed which spans the distance between the electrodes and causes failure. Materials that do not track may erode under the action of the arcing. Such erosion usually progresses from an upper electrode through the thickness of the specimen towards the underlying electrode.

4.2 Rate materials that track in terms of the time required to form a track between the electrodes.

4.3 Rate materials that do not track in terms of the time required to erode to failure.

4.4 Failure will be indicated when the current increases sufficiently to actuate an overcurrent device.

NOTE 2—The conditions of this test favor the formation of a track for several possible reasons. Most important, the continuous renewal of the conducting properties of the contaminant by the water spray allows a track to grow progressively over long periods of time.

5. Significance and Use

5.1 *Method*—Electrical insulation in service may fail as a result of tracking, erosion, or a combination of both, if it is exposed to high relative humidity and contamination environments. This is particularly true of organic insulations in outdoor applications where the surface of the insulation becomes contaminated by deposits of moisture and dirt, for example, coal dust or salt spray. This test method is an accelerated test that simulates extremely severe outdoor contamination. It is believed that the most severe conditions likely to be encountered in outdoor service in the United States will be relatively mild compared to the conditions specified in this test method.

