



Designation: D 2303 – 97

An American National Standard

Standard Test Methods for Liquid-Contaminant, Inclined-Plane Tracking and Erosion of Insulating Materials¹

This standard is issued under the fixed designation D 2303; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 These test methods cover the evaluation of the relative tracking and erosion resistance of insulating solids using the liquid-contaminant, inclined-plane test.² The following test methods also can be used to evaluate the tracking resistance of materials: D 2132 (contaminants: dust and fog) and D 3638 (contaminant: conductive liquid drops).

1.2 Two tracking and one erosion test procedure are described:

1.2.1 A “variable voltage method” to evaluate resistance to tracking.

1.2.2 A “time-to-track method” to evaluate resistance to tracking.

1.2.3 A method for quantitative determination of erosion (Annex A1).

1.3 While a particular contaminant solution is specified, other concentrations of the same contaminant, or different contaminants may be used to simulate different environmental or service conditions.

1.4 The values stated in inch-pound units are to be regarded as the standard.

1.5 *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 Section 8.

2. Referenced Documents

2.1 ASTM Standards:

D 374 Test Methods for Thickness of Solid Electrical Insulation³

D 1711 Terminology Relating to Electrical Insulation³

D 2132 Test Method for Dust- and Fog-Tracking and Erosion Resistance of Electrical Insulating Materials³

D 3638 Test Method for Comparative Tracking Index of Electrical Insulating Materials⁴

3. Terminology

3.1 Definitions:

3.1.1 *erosion, electrical, n*—the progressive wearing away of electrical insulation by the action of electrical discharges.

3.1.2 *erosion resistance, electrical, n*—the quantitative expression of the amount of electrical erosion under specific conditions.

3.1.3 *track, n*—a partially conducting path of localized deterioration on the surface of an insulating material.

3.1.4 *tracking, n*—the process that produces tracks as a result of the action of electric discharges on or close to the insulation surface.

3.1.5 *tracking, contamination, n*—tracking caused by scintillations that result from the increased surface conduction due to contamination.

3.1.6 *tracking resistance, n*—the quantitative expression of the voltage and the time required to develop a track under specified conditions.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *initial tracking voltage, n*—the applied voltage at which continuous tracking can be initiated in a specified time.

3.2.2 *time-to-track, n*—the time in which tracking proceeds a specified distance between the test electrodes at a specified voltage.

3.3 Other definitions pertinent to these test methods are given in Terminology D 1711.

4. Significance and Use

4.1 These test methods differentiate among solid electrical insulating materials on the basis of their resistance to the action of voltage stresses along the surface of the solid when wet with an ionizable, electrically conductive, liquid contaminant.

4.2 These test methods quantitatively evaluate, in a relative manner, the effects upon an insulating material resulting from

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² K. N. Mathes, Chapter 4, “Surface Failure Measurements,” *Engineering Dielectrics, Vol IIB, Electrical Properties of Solid Insulating Materials, Measurement Techniques*, R. Bartnikas, Editor, ASTM STP 926, ASTM, Philadelphia, 1987.

³ *Annual Book of ASTM Standards*, Vol 10.01.

⁴ *Annual Book of ASTM Standards*, Vol 10.02.