



Standard Test Method for Comparative Tracking Index of Electrical Insulating Materials¹

This standard is issued under the fixed designation D3638; 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 evaluates in a short period of time the low-voltage (up to 600 V) track resistance or comparative tracking index (CTI) of materials in the presence of aqueous contaminants.

1.2 The values stated in metric (SI) units are to be regarded as standard. The inch-pound equivalents of the metric units are approximate.

1.3 This standard is technically equivalent to the version of IEC Publication 112 cited in 2.2. However, the 2007 version of IEC 60112 Fourth Edition yields numerical CTI values that are very likely to differ significantly from this standard.

1.4 *This standard does not purport to address all of the safety problems, 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.*

2. Referenced Documents

2.1 ASTM Standards:²

[D1711 Terminology Relating to Electrical Insulation](#)

[D6054 Practice for Conditioning Electrical Insulating Materials for Testing](#) (Withdrawn 2012)³

2.2 IEC Publication:

[112 Recommended Method for Determining the Comparative Track Index of Solid Insulating Materials Under Moist Conditions, 1971 Second Edition](#)⁴

[60112 Recommended Method for Determining the Comparative Track Index of Solid Insulating Materials Under](#)

[Moist Conditions, 2007 Fourth Edition](#)⁴

3. Terminology

3.1 Definitions:

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

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

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

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

3.1.5 For other terminology, refer to Terminology [D1711](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *comparative tracking index*—an index for electrical insulating materials which is arbitrarily defined as the numerical value of that voltage which will cause failure by tracking when the number of drops of contaminant required to cause failure is equal to 50.

3.2.1.1 *Discussion*—The voltage value is obtained from a plot of the number of drops required to cause failure by tracking versus the applied voltage.

3.2.2 *failure, n*—an attribute of an electrical circuit containing an electrical-current-sensing device that rapidly decreases the applied voltage to zero if the current in the circuit exceeds a predetermined limit.

4. Summary of Test Method

4.1 The surface of a specimen of electrical insulating material is subjected to a low-voltage alternating stress combined with a low current which results from an aqueous contaminant (electrolyte) which is dropped between two opposing electrodes every 30 s. The voltage applied across these electrodes is maintained until the current between them exceeds a predetermined value. This condition constitutes a failure. Additional specimens are tested at other voltages so that a relationship between applied voltage and number of drops to failure can be established through graphical means.

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 D09.12 on Electrical Tests.

Current edition approved Jan. 1, 2012. Published February 2012. Originally approved in 1977. Last previous edition approved in 2007 as D3638 – 07. DOI: 10.1520/D3638-12.

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from the International Electrotechnical Commission, Geneva, Switzerland.