



Designation: D 2803 – 03

# Standard Guide for Testing Filiform Corrosion Resistance of Organic Coatings on Metal<sup>1</sup>

This standard is issued under the fixed designation D 2803; 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 ( $\epsilon$ ) 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 This guide covers three procedures for determining the susceptibility of organic-coated metal substrates to formation of filiform corrosion.

1.2 This guide is limited to the determination of whether filiform corrosion will occur between the organic coating and substrate.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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:<sup>2</sup>

- B 117** Practice for Operating Salt Spray (Fog) Testing Apparatus
- D 609** Practice for Preparation of Cold-Rolled Steel Panels For Testing Paint, Varnish, Conversion Coatings, and Related Coating Products
- D 823** Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
- D 1005** Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
- D 1186** Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
- D 1400** Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base

- D 1654** Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- D 1730** Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting
- E 104** Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions
- 2.2 *International Standard:*<sup>3</sup>
  - ISO 4623-1** Paints and Varnishes—Determination of resistance to filiform corrosion—Part 1: On steel
  - ISO 4623-2** Paints and Varnishes—Determination of resistance to filiform corrosion—Part 2: On aluminum
  - ISO 4628-10** Paints and Varnishes—Evaluation of degradation of coatings—Designation of quantity and size of defects and of intensity of changes—Part 10: Assessment of filiform corrosion

## 3. Terminology

### 3.1 Definitions:

- 3.1.1 *filiform corrosion*—a special type of corrosion that occurs under coatings on metal substrates that is characterized by a definite threadlike structure and directional growth.
  - 3.1.1.1 *Discussion*—Filiform corrosion usually occurs between 20 and 35°C (70 and 95°F), with a corresponding relative humidity range of 60 to 95 %; above 95 % humidity, blistering rather than filiform corrosion may occur.

## 4. Summary of Method

4.1 Coated metal specimens are scribed and placed in a corrosive atmosphere to initiate corrosion. The specimens are then exposed to controlled temperature and humidity conditions known to be conducive to filiform corrosion.

4.2 In Procedure A, panels are subjected to a preliminary exposure in the salt spray cabinet to initiate corrosion, rinsed, and placed in a humidity cabinet. In Procedure B, based on ISO 4623, panels are either exposed to salt spray or dipped in a salt solution but not rinsed before placing in the humidity cabinet operated at a higher temperature than in Procedure A. In Procedure C, specimens are exposed as in Procedure A except the humidity cabinet is operated at a higher temperature.

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.27 on Accelerated Testing.

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<sup>2</sup> 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.

<sup>3</sup> Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.