



# Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members<sup>1</sup>

This standard is issued under the fixed designation E937; 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.

## 1. Scope

1.1 This test method covers a procedure for measuring the corrosion to steel induced by sprayed fire-resistive material.

1.2 These SFRMs include sprayed fibrous and cementitious materials applied directly in contact with the structural members.

1.3 This test method is applicable only to laboratory procedures.

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

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.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[E119 Test Methods for Fire Tests of Building Construction and Materials](#)

[E605 Test Methods for Thickness and Density of Sprayed Fire-Resistive Material \(SFRM\) Applied to Structural Members](#)

[E631 Terminology of Building Constructions](#)

## 3. Terminology

3.1 *Definitions*—Definitions in this test method are in accordance with Terminology [E631](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *corrosion*—chemical reaction between a metal and its environment that produces a deterioration of the metal and its properties.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

Current edition approved May 1, 2005. Published May 2005. Originally approved in 1983. Last previous edition approved in 2000 as E937 – 92 (2000). DOI: 10.1520/E0937-93R05.

<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.

3.2.2 *sprayed fire-resistive materials*—materials that are sprayed onto substrates to provide fire-resistive protection of the substrates.

## 4. Summary of Test Method

4.1 In this test method replicate panels of bare, shop-coated, and galvanized steel are sprayed with SFRM and subjected to room temperature and humidity conditions and to 240 h of conditioning in a temperature- and humidity-controlled chamber. Corrosion induced under these conditions is determined by weight loss<sup>3</sup> of the sheets as related to sheets not so conditioned.

## 5. Significance and Use

5.1 It is the intent of this test method to determine relative corrosive properties of direct applied SFRM that provides an indication of serviceability. Satisfactory performance of SFRM applied to structural members and assemblies depends upon its ability to withstand the various influences that occur during the life of the structure, as well as upon its satisfactory performance under fire conditions.

5.2 This test method evaluates the relative corrosion of steel induced by SFRM and determines whether the presence of SFRM increases, decreases, or has no effect on the corrosion characteristics of steel.

## 6. Apparatus

6.1 *Standard Temperature Humidity Cabinet*, equipped to maintain the temperature at  $35 \pm 1.7^\circ\text{C}$  ( $95 \pm 3^\circ\text{F}$ ) and a relative humidity of  $95 \pm 3\%$ . The cabinet and all accessories shall be of a material that does not affect the corrosiveness of the atmosphere in the cabinet. Additionally, all parts that come into contact with the test specimens shall be made of material that will not cause electrolytic corrosion. Adequate circulation of the atmosphere over the specimens shall be provided.

6.2 *Scale*, having a capacity of 5 kg and a sensitivity of  $\pm 0.1$  g.

<sup>3</sup> Although “mass” is being determined, the term weight is used in this test method as an accepted substitute.