



Designation: D 6137 – 97

## Standard Test Method for Sulfuric Acid Resistance of Polymer Linings for Flue Gas Desulfurization Systems<sup>1</sup>

This standard is issued under the fixed designation D 6137; 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 is intended to evaluate the sulfuric acid resistance at elevated temperatures of polymer linings applied to carbon steel substrates subject to sulfuric acid attack.

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

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- A 36/A 36M Specification for Structural Steel<sup>2</sup>
- C 868 Test Method for Chemical Resistance of Protective Linings<sup>3</sup>
- D 660 Test Method for Evaluating Degree of Checking of Exterior Paints<sup>4</sup>
- D 661 Test Method for Evaluating Degree of Cracking of Exterior Paints<sup>4</sup>
- D 714 Test Method for Evaluating Degree of Blistering of Paint<sup>4</sup>
- D 772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints<sup>4</sup>
- D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base<sup>4</sup>
- D 1474 Test Method for Indentation Hardness of Organic Coatings<sup>4</sup>
- D 4138 Test Method for Dry Film Thickness of Protective Coating Systems by Destructive Means<sup>5</sup>
- D 4417 Test Method for Field Measurement of Surface Profile of Blast Cleaned Steel<sup>5</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of Subcommittee D33.09 on Protective Lining for FGD Systems. Current edition approved June 10, 1997. Published August 1997.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.04.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.05.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 06.01.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.02.

D 5162 Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates<sup>5</sup>

2.2 *Steel Structures Painting Council Standards*<sup>6</sup>

SSPC VIS 1-89 Visual Standard

SSPC No. SP5 Blast Cleaning to White Metal

### 3. Significance and Use

3.1 The results obtained by this test method can be used in combination with other test methods for the selection of a lining for surfaces in flue gas desulfurization (FGD) systems that will be exposed to hot unscrubbed flue gas or to scrubbed gas that has been reheated well above the water dew point.

3.1.1 This test method does not evaluate or correlate to areas within the scrubber or scrubbed gas streams at temperatures at or below the water dew point.

3.2 This test method is intended to evaluate the combined effects of heat and exposure to sulfuric acid upon a lining system as applied to a carbon steel substrate. It does not produce the thermal gradient through the lining that may exist in actual applications. Actual lining performance may also be affected by concurrent physical or mechanical effects and other chemicals that may be present in the flue gas.

3.3 This test method evaluates major failure modes of linings applied to square test panels that are cycled from room temperature to a designated elevated temperature.

3.4 The recommended test temperatures of 200°F (93°C) and 350°F (177°C) are based on typical maximum operating zone temperatures in flue gas desulfurizations systems. Other temperatures may be evaluated as desired. Cycling to lower temperatures, including freezing, may be considered if applicable.

3.5 The standard acid concentration for all tests is 20 %, recognizing that the concentration will quickly rise to the equilibrium at the selected test temperature.

### 4. Apparatus

4.1 *Forced Air Circulation Oven*, capable of maintaining the selected test temperature  $\pm 4$  F° (2C°). Note that acid fumes may damage the oven and a drip pan and protective shroud may be needed.

<sup>6</sup> Available from the Steel Structures Painting Council (SSPC), 5416 Henry St., Pittsburgh, PA 15213.