



Designation: D 5499 – 94 (Reapproved 1999)

Standard Test Methods for Heat Resistance of Polymer Linings for Flue Gas Desulfurization Systems¹

This standard is issued under the fixed designation D 5499; 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 is intended to evaluate the resistance of polymer linings applied to carbon steel substrates to elevated temperatures. Two separate methods are included as follows:

Test Method A Continuous elevated temperature exposure, and

Test Method B Cycling elevated temperature exposure.

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 Carbon Structural Steel²
- D 660 Test Method for Evaluating Degree of Checking of Exterior Paints³
- D 661 Test Method for Evaluating Degree of Cracking of Exterior Paints³
- D 714 Test Method for Evaluating Degree of Blistering of Paints³
- D 772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints³
- D 1474 Test Method for Indentation Hardness of Organic Coatings³
- D 4417 Test Method for Field Measurement of Surface Profile of Blast Cleaned Steel⁴
- D 4541 Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers⁴

- 2.2 Steel Structures Painting Council Standards (SSPC)⁵:
 - SSPC Vis 1–89 Visual Standard
 - SSPC No. SP5 Blast Cleaning to White Metal
 - SSPC PA-2 Measurement of Dry Paint Thickness with Magnetic Gauges

3. Significance and Use

3.1 The results obtained by these test methods can be used in combination with other test methods for the selection of a lining in flue gas desulfurization (FGD) systems.

3.2 These methods are intended to evaluate effects of heat alone upon a lining system as applied to a carbon steel substrate. These methods do not produce the thermal gradient that may exist in actual applications. Actual lining performance may also be effected by concurrent physical mechanical or chemical effects.

3.3 These methods evaluate major failure modes of linings applied to square test panels.

3.4 The recommended test temperatures of 200°F (93°F) 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.

4. Apparatus

4.1 *Forced-air Circulation Oven*, capable of maintaining the selected test temperature within 4°F (2°C).

4.2 *A Rack or Stand* to support the test panels vertically in the oven while maintaining a distance of at least 1 in. (25 mm) between the panels and between the panels and oven walls.

5. Test Specimens

5.1 *Substrate:*

5.1.1 Test panels shall be new commercial quality carbon steel conforming to Specification A 36/A 36M. Panels shall be a minimum of 1/4 in. (6 mm) thick, and 8 in. (200 mm) square.

5.1.2 These test panels are large enough and rigid enough for linings and coatings up to 0.25-in. (6-mm) thick. For thicker linings, the test panels shall be at least 32 times the lining thickness in each direction.

¹ 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 Linings for FGD Systems.

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² *Annual Book of ASTM Standards*, Vol 01.04.

³ *Annual Book of ASTM Standards*, Vol 06.01.

⁴ *Annual Book of ASTM Standards*, Vol 06.02.

⁵ Available from Steel Structures Painting Council (SSPC), 4516 Henry St., Pittsburgh, PA 15213.