



Designation: D 5161 – 96

## Standard Guide for Specifying Inspection Requirements for Coating and Lining Work (Metal Substrates)<sup>1</sup>

This standard is issued under the fixed designation D 5161; 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 guide is intended to aid the coating specification writer in selecting and specifying the appropriate inspection requirements. It indicates the inspection requirements that may be employed for each of four service environments including mild, moderate, severe, and immersion (see Table 1).

1.2 In order to aid the user in determining when to specify inspection requirements, a relationship between the consequence of failure and the suggested level of inspection is demonstrated (see Fig. 1).

1.3 It is not the intent of this guide to address the selection of protective coating systems, to specify surface preparation and application requirements, or to be a referenced document in a specification.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Metal Base<sup>2</sup>
- D 1400 Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base<sup>2</sup>
- D 3276 Guide for Painting Inspectors (Metal Substrates)<sup>3</sup>
- D 4285 Test Method for Indicating Oil or Water in Compressed Air<sup>3</sup>
- D 4414 Practice for Measurement of Wet Film Thickness by Notch Gages<sup>2</sup>
- D 4417 Test Method for Field Measurement of Surface Profile of Blast Cleaned Steel<sup>3</sup>
- D 4940 Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blasting Abrasives<sup>3</sup>
- D 5162 Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates<sup>3</sup>
- E 337 Test Method for Measuring Humidity with a Psy-

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of Subcommittee D33.04 on Quality Systems and Inspection.

Current edition approved May 10, 1996. Published July 1996. Originally published as D 5161 – 91. Last previous edition D 5161 – 91.

<sup>2</sup> Annual Book of ASTM Standards, Vol 06.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 06.02.

**TABLE 1 Inspection Requirements**

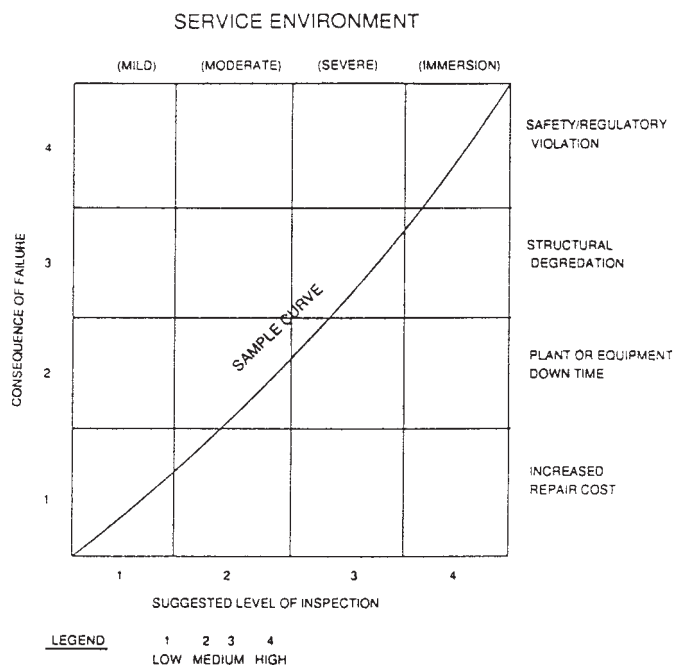
Suggested Inspection Requirements	Service Environments			
	Mild	Moderate	Severe	Immersion
Pre-Surface Preparation:				
Visual for contaminants	X	X	X	X
Visual for surface anomalies			X	X
Surface Preparation:				
Air supply for contaminants			X	X
Abrasives for type and cleanliness			X	X
Ambient conditions and dew point			X	X
Surface anomalies			X	X
Degree of cleanliness	X	X	X	X
Profile		X	X	X
Visual final for contamination			X	X
Coating Application:				
Materials		X	X	X
Mixing			X	X
Equipment		X	X	X
Air supply for contaminants		X	X	X
Ambient conditions and dew point			X	X
Wet film thickness			X	X
Intercoat parameters		X	X	X
Appearance between coats			X	X
Dry film thickness between coats			X	X
Final Acceptance:				
Appearance	X	X		
Visual runs and sags		X	X	X
Visual holidays and pinholes			X	X
Dry film thickness		X	X	X
Holiday tests				X
Repairs			X	X
Final cure			X	X

chrometer (the Measurement of Wet and Dry-Bulb Temperatures)<sup>4</sup>

#### 2.2 SSPC Standard:<sup>5</sup>

<sup>4</sup> Annual Book of ASTM Standards, Vol 11.03.

<sup>5</sup> Available from Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh, PA 15213.



NOTE 1—This figure is provided as a visual aid to represent graphically the general relationship between the consequence of failure and the suggested level of inspection. The slope and configuration of the curve will vary due to the many factors affecting the consequence of failure, however, the suggested level of inspection should increase when the service environment is more severe.

**FIG. 1 Relationship Between the Consequence of Failure and the Suggested Level of Inspection**

SSPC-Visl-89 Visual Standard for Abrasive Blast Cleaned Steel

SSPC-Visl-3 Visual Standard for Power Tool Cleaned Steel

### 3. Terminology

3.1 Service Environments Terms are as follows:

3.1.1 *mild service*—indoor or protected outdoor areas not subject to rain, dew or corrosive elements, or both.

3.1.2 *moderate service*—areas subject to weather away from coastal or corrosive industrial environments, or both.

3.1.3 *severe service*—corrosive/erosive environments including coastal salt laden atmosphere, industrial atmosphere, and high intensity sunlight.

3.1.4 *immersion service*—wetted surfaces of tanks, containers, pits, etc and surfaces that are normally wet with condensation or exposed to other corrosive environments.

### 4. Significance and Use

4.1 The requirements for inspection should be addressed in all protective coating and lining work specifications.

4.2 This guide may be used by specification writers when selecting and establishing the inspection requirements for coating and lining specifications.

4.3 The instructions for using this guide are as follows:

4.3.1 Identify the service environment for the coating or lining system being specified. Read down the column under the appropriate service environment in Table 1. Suggested levels of inspection listed on the left are identified with x's.

### 5. Inspection Requirements

#### 5.1 Pre-Surface Preparation:

5.1.1 *Contaminants*—Visually verify that oil and grease are removed from the surface prior to surface preparation operations (see Guide D 3276).

5.1.2 *Surface Anomalies*—Visually verify that welds and sharp or jagged edges have been suitably prepared for the coating system being used (see Guide D 3276).

#### 5.2 Surface Preparation:

5.2.1 *Air Supply*—Verify that air supply is clean and dry (see Test Method D 4285).

5.2.2 *Abrasives*—Verify cleanliness and proper size and type to achieve specified profile (see Test Method D 4940).

5.2.3 *Ambient Conditions*—Verify that air temperature, humidity, surface temperature, and dew point spread are appropriate (see Test Method E 337).

5.2.4 *Surface Anomalies*—Identify any burrs, slivers, scabs, and weld spatter visible after blasting.

5.2.5 *Surface Cleanliness*—Verify degree of surface cleanliness (see SSPC-Visl-89 or Visl-3).

5.2.6 *Profile*—Verify profile is within specified tolerance using appropriate instruments (see Test Method D 4417).

5.2.7 *Surface Contamination*—Verify that all visible surface contaminants including oil, grease, dust, etc have been removed.

#### 5.3 Coating Application:

5.3.1 *Materials*—Verify that the coating materials and thinners are as specified, properly labeled and stored, and are within their shelf life.

5.3.2 *Mixing*—Verify that the coating materials are mixed in accordance with the manufacturer's instructions.

5.3.3 *Equipment*—Verify that proper application equipment is being utilized.

5.3.4 *Air Supply*—Verify that air supply is clean and dry (see Test Method D 4285).

5.3.5 *Ambient Conditions*—Verify that air temperature, humidity, surface temperature, and dew point spread are appropriate (see Test Method E 337).

5.3.6 *Wet Film Thickness*—Verify that the applicator is checking wet film thickness during the application process when required (see Practice D 4414).

5.3.7 *Intercoat Parameters*—Verify that parameters during recoat are observed and that no surface contaminants are present.

5.3.8 *Appearance*—Visually inspect each coat for defects and uniform appearance (see Guide D 3276).

5.3.9 *Dry Film Thickness*—Verify that the dry film thickness is within the specified range after each coat (see Test Methods D 1186 and D 1400).

#### 5.4 Final Acceptance:

5.4.1 *Appearance*—Visually inspect the surface for defects and uniform appearance (see Guide D 3276).

5.4.2 *Dry Film Thickness*—Verify that the total coating system's dry film thickness is within the specified range (see Test Methods D 1186 and D 1400).

5.4.3 *Holiday Test*—Verify that the surface meets the specified holiday/pinhole criteria (see Practice D 5162).