



Designation: D 5163 – 05

# Standard Guide for Establishing Procedures to Monitor the Performance of Coating Service Level I Coating Systems in an Operating Nuclear Power Plant<sup>1</sup>

This standard is issued under the fixed designation D 5163; 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 guide covers procedures for establishing a program to monitor the performance of Coating Service Level I coating systems in operating nuclear power plants. Monitoring is an on going process of evaluating the condition of the in-service coating systems.

1.2 It is the intent of this guide to provide a recommended basis for establishing a coatings monitoring program, not to mandate a singular basis for all programs. Variations or simplifications of the program described in this guide may be appropriate for each operating nuclear power plant depending on their licensing commitments. Similar guidelines are applicable for Coating Service Level III and other areas outside containment.

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:* <sup>2</sup> <https://www.astm.org/catalog/standards/sist/d838a99c-3527-4358f79/astm-d5163-05>

**D 610** Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces

**D 714** Test Method for Evaluating Degree of Blistering of Paints

**D 1186** Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base

**D 3359** Test Methods for Measuring Adhesion by Tape Test

**D 4537** Guide for Establishing Procedures to Qualify and Certify Personnel Performing Coating Work Inspection in Nuclear Facilities

**D 4541** Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

**D 6677** Test Method for Evaluating Adhesion by Knife

**F 1130** Practice for Inspecting the Coating System of a Ship  
2.2 *ANSI Standard:*

N45.2.6—Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants<sup>3</sup>

2.3 *SSPC Standard:*

SSPC-PA 2—Measurement of Dry Paint Thickness With Magnetic Gages<sup>4</sup>

SSPC-VIS 2—Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces<sup>4</sup>

## 3. Significance and Use

3.1 Establishment of an in-service coatings monitoring program permits planning and prioritization of coatings maintenance work as needed to maintain coating integrity and performance in nuclear Coating Service Level I coating systems. For additional information on nuclear maintenance coating work, refer to ASTM Manual on Maintenance Coatings for Nuclear Power Plants.<sup>5</sup>

3.2 A coatings monitoring program enables early identification and detection of potential problems in coating systems. Some Coating Service Level I coating systems may be known in advance to be suspect, deficient, or unqualified. Monitoring coating performance will assist in developing follow-up procedures to resolve any significant deficiency relative to coating work.

3.3 Degraded coatings may generate debris under design basis accident conditions that could adversely affect the performance of the post-accident safety systems. A coatings monitoring program may be required to fulfill safety analysis report and generic letter commitments for Coating Service Level I coating work in a nuclear power plant facility.

<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 Jan. 1, 2005. Published February 2005. Originally approved in 1991. Last previous edition approved in 2004 as D 5163 – 04a.

<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 (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

<sup>4</sup> Available from SSPC: The Society for Protective Coatings, 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656.

<sup>5</sup> Available from ASTM International Headquarters, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.

#### 4. Responsibility

4.1 The owner/operator shall identify the department or group within the organization to be responsible for establishing the applicable requirements for activities or procedures covered by this guide and shall document the scope of their responsibility. Owner/operator delegation of this responsibility to other outside qualified organizations is permitted and shall be documented.

4.2 It is the responsibility of the owner/operator or his designee performing these activities to specify the detailed methods and procedures for meeting the applicable requirements of this guide.

4.3 The owner/operator or his designee shall assign a coordinator to be responsible for supervising coating inspection activities, data collection and documentation, and for ensuring that inspection personnel are adequately trained and qualified.

4.4 The owner/operator shall assign responsibility for evaluating the results of inspection activities carried out under the coatings performance monitoring program.

4.5 In the event of conflict, users of this guide must recognize that the licensee's plant-specific quality assurance program and licensing commitments shall prevail with respect to the coating performance monitoring process.

#### 5. Frequency

5.1 Frequency of in-service coating inspection monitoring shall be determined by the owner/operator. In operating nuclear power plants certain monitoring activities may be restricted to major maintenance outages or refueling outages. It is a good practice to perform inspections during each refueling outage or during other major maintenance outages as needed.

#### 6. Records and Past History

6.1 Coating performance will depend on the operating conditions experienced by the coating systems. Records of these conditions shall be obtained for each operating unit. These may include, but not be limited to, ambient conditions, temperatures, humidity, immersion, splash and spillage, chemical exposures, radiation exposures, previous decontamination procedures, abrasion and physical abuse, and start-up/shutdown frequency. Any change in service criteria or modifications of the physical design must be identified and dated.

6.2 The last two performance monitoring reports pertaining to the coating systems shall be reviewed prior to the monitoring process. Other past coatings history data to be reviewed may include:

6.2.1 Copies of coating specifications, manufacturer's product data sheets, and application procedures for in-place coatings.

6.2.2 Quality control documentation for the existing in-place coating systems and their application.

6.2.3 Copies of previous inspection or monitoring reports.

6.2.4 Documentation pertaining to any maintenance work performed on existing coating systems.

#### 7. Monitoring Procedure

7.1 Prior to conducting an inspection of the coating systems, the responsible organization shall ensure that the necessary

services and equipment required for inspection are provided. Factors that must be considered while planning the inspection activities include, but are not limited to, lighting, access to coated surfaces, cleaning surfaces of any deposit or build up, ventilation and, where necessary, special underwater inspection requirements.

7.2 Station access procedures for Coating Service Level I coating systems monitoring shall be followed. While access procedures may vary from plant to plant, specific station access procedures may include:

7.2.1 Security clearance for protected, radiation controlled, and vital areas, and escorted or unescorted clearance as required,

7.2.2 Radiological history including prior radiation exposure for all personnel involved,

7.2.3 Health physics classroom training in the use of radiation detection and monitoring devices and procedures for wearing anticontamination clothing,

7.2.4 A radiation work permit based on health physics radiological survey of the work location,

7.2.5 Compliance with radiation work permit requirements and other special radiation controls unique to each work location, and

7.2.6 Issuance of dosimetry.

7.3 The safety requirements of the facility owner/operator must be met when performing all inspection operations.

#### 8. Personnel Requirements, Qualifications, and Training

8.1 The facility owner/operator shall specify the requirements and guidelines for qualification and training of personnel involved in the coatings performance monitoring program. Unless otherwise required in the licensee's OA program or licensing commitments, individuals who perform and coordinate coating condition assessment shall be knowledgeable coatings personnel. Should the assessment determine that specific quantitative follow-up inspection is needed, individuals performing that inspection shall meet the requirements of Guide **D 4537** for Level I inspection or ANSI N45.2.6.

8.2 The evaluator shall be a person knowledgeable and experienced in nuclear coatings work.

#### 9. Inspection Plan

9.1 The owner/operator shall develop a plant specific inspection plan to accomplish the objectives of the monitoring program. A general visual inspection shall be conducted on all readily accessible coated surfaces during a walk-through. After the walk-through, thorough visual inspections shall be carried out on previously designated areas and on areas noted as deficient during the walk-through. A thorough visual inspection shall also be carried out on all coatings near sumps or screens associated with the Emergency Core Cooling System (ECCS). The inspection plan shall address the following based on specific owner/operator requirements:

9.1.1 A pre-inspection briefing to familiarize all personnel performing inspection with objectives of the inspections, procedures to be followed, and precautions to be taken,

9.1.2 Monitoring team(s) assignments to specific areas for inspection(s), and