



Designation: D5163 – 16 (Reapproved 2021)

Standard Guide for Establishing a Program for Condition Assessment of Coating Service Level I Coating Systems in Nuclear Power Plants¹

This standard is issued under the fixed designation D5163; 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 standard covers procedures for establishing a monitoring program for condition assessment of Coating Service Level (CSL) I coating systems in operating nuclear power plants. Monitoring is an ongoing process of evaluating the condition and performance of the in-service coating systems.

1.2 It is the intent of this standard to provide a recommended basis for establishing a coatings condition assessment program, not to mandate a singular basis for all programs. Variations or simplifications of the program described in this standard may be appropriate for each operating nuclear power plant depending on their licensing commitments.

1.3 This requirements of ASME Section XI, In-Service Inspection Subsections IWE and IWL are beyond the scope of this standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ 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.

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² 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.

D610 Practice for Evaluating Degree of Rusting on Painted Steel Surfaces

D714 Test Method for Evaluating Degree of Blistering of Paints

D3359 Test Methods for Rating Adhesion by Tape Test

D4538 Terminology Relating to Protective Coating and Lining Work for Power Generation Facilities

D4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

D5498 Guide for Developing a Training Program for Personnel Performing Coating and Lining Work Inspection for Nuclear Facilities

D6677 Test Method for Evaluating Adhesion by Knife

D7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

D7108 Guide for Establishing Qualifications for a Nuclear Coatings Specialist

D7234 Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

2.2 SSPC Standards:³

SSPC-PA 2 Procedure for Determining Conformance to Dry Coating Thickness Requirements

SSPC-PA 9 Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages

SSPC-VIS 2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces

3. Terminology

3.1 *Definitions*—Definitions for use with this standard are shown in Terminology D4538 or other applicable standards.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *coating condition assessment, n*—overall evaluation of the coating condition based upon performance monitoring and visual inspection.

³ Available from Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

3.2.2 *coating maintenance work, n*—all-inclusive term associated with coating work that expressly relates to repair, refurbishment, or replacement of an existing coating. (See also *coating work*.)

3.2.3 *in-service coatings monitoring program, n*—systematic program established to assess and document the condition of an existing coating system with respect to prescribed performance attributes.

4. Significance and Use

4.1 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 CSL I coating systems. For additional information on nuclear maintenance coating work, refer to ASTM MNL8.⁴

4.2 A coatings monitoring program enables early identification and detection of potential problems in coating systems. Some CSL 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.

4.3 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 CSL I coating work in a nuclear power plant facility.

5. Responsibility

5.1 The licensee or his designee should identify the department or group within the organization to be responsible for establishing the applicable requirements for activities or procedures covered by this standard and should document the scope of their responsibility. Delegation of this responsibility to other outside qualified organizations is permitted and should be documented.

5.2 The assigned department or group shall specify the detailed methods and procedures for meeting the applicable requirements of this standard.

5.3 The licensee's Nuclear Coating Specialist, or other individual assigned by the department or group should be responsible for:

5.3.1 Coordinating inspections, and any necessary testing, of existing coatings.

5.3.2 Evaluating the results and assessing the coating condition.

5.3.3 Establishing priorities for coating repair/replacement.

5.3.4 Performing a specific follow-up inspection as necessary to investigate and resolve anomalies or degradation identified during the initial walk down.

5.4 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.

6. Frequency

6.1 Frequency of in-service coating inspection monitoring shall be determined by the licensee or his designee. 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.

7. Records and Past History

7.1 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 shall be identified and dated.

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

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

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

7.2.3 Copies of previous inspection or monitoring reports.

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

8. Monitoring Procedure

8.1 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.

8.2 Station access procedures for CSL I coating systems monitoring shall be followed. While access procedures may vary from plant to plant, specific station access procedures may include:

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

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

8.2.3 Health physics classroom training in the use of radiation detection and monitoring devices and procedures for wearing anti-contamination clothing,

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

⁴ MNL8, Manual on Maintenance Coatings for Nuclear Power Plants. Available from ASTM International Headquarters, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.