



Designation: D4082 – 10 (Reapproved 2023)

Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Nuclear Power Plants¹

This standard is issued under the fixed designation D4082; 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 covers a standard procedure for evaluating the lifetime radiation tolerance of coatings to be used in nuclear power plants. This test method is applicable to Coating Service Levels I, II, and III.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

1.4 *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

D659 Method for Evaluating Degree of Chalking of Exterior Paints (Withdrawn 1990)³

D660 Test Method for Evaluating Degree of Checking of Exterior Paints

D661 Test Method for Evaluating Degree of Cracking of Exterior Paints

D714 Test Method for Evaluating Degree of Blistering of Paints

D772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints

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

D5139 Specification for Sample Preparation for Qualification Testing of Coatings to be Used in Nuclear Power Plants

3. Terminology

3.1 *Definitions*—Definitions for use with this Test Method are shown in Terminology **D4538** or other referenced standards.

4. Significance and Use

4.1 This test method is designed to provide a uniform test to assess the suitability of coatings, used in nuclear power facilities, under radiation exposure for the life of the facilities, including radiation during a DBA (Coating Service Level I areas only). Specific plant radiation exposure may exceed or be less than the amount specified in 7.2 of this standard. If required by the licensee design basis, the gamma dose used may exceed the actual anticipated plant gamma dose to account for beta dose. Coatings in Level II and III areas (outside primary containment) are expected to be exposed to lower accumulated radiation doses.

5. Preparation of Test Samples

5.1 *Steel Panels*—Panels shall be prepared in accordance with Specification **D5139** or as approved by the licensee.

5.2 *Concrete Blocks*—Blocks shall be prepared in accordance with Specification **D5139** or as approved by the licensee.

6. Sampling

6.1 Prepare and test specimens at least in duplicate, or as otherwise specified by the licensee.

7. Procedures

7.1 Irradiation Dose Rate:

7.1.1 Make the gamma energy field at the position of the test specimen 1×10^6 rads/h, or greater, unless otherwise specified by the licensee. It shall be uniform to within 10 % from one position of the specimen to another.

¹ This test method 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 **D33.02** on Service and Material Parameters.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.