



Standard Test Method for Evaluating Coatings Used in Light-Water Nuclear Power Plants at Simulated Design Basis Accident (DBA) Conditions¹

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INTRODUCTION

During a DBA in nuclear power plants, conditions in the reactor containment will be characterized by elevated temperature and pressure, as well as the presence of a radiation environment. Water sprays, with or without chemical additives, may be used in the primary containment to suppress the consequences of the event, to scavenge radioactive products, and to return the containment to near-ambient pressure and temperature conditions.

1. Scope

1.1 This test method establishes procedures for evaluating protective coating systems test specimens under simulated DBA conditions. Included are a description of conditions and apparatus for temperature-pressure testing, and requirements for preparing, irradiating, testing, examining, evaluating, and documenting the samples.

1.2 Consideration should be given to testing using worst case conditions (for example, surface preparation, temperature and pressure profile, irradiation, spray chemistry, chemical resistance, etc.) in an effort to reduce the number of tests required by changing plant accident calculations, changes in coating selection, etc.

1.3 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.

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

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. Referenced Documents

2.1 *ASTM Standards:*²

D714 Test Method for Evaluating Degree of Blistering of Paints

D4082 Test Method for Effects of Gamma Radiation on Coatings for Use in Nuclear Power Plants

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 standard are shown in Terminology D4538 or other applicable standards.

4. Significance and Use

4.1 This test method is designed to provide a uniform test to determine the suitability of Coating Service Level 1 coatings used inside primary containment of light-water nuclear facilities under simulated DBA conditions. This test method is intended only to demonstrate that under DBA conditions, the coatings will remain intact and not form debris which could unacceptably compromise the operability of engineered safety systems. Deviations in actual surface preparation and in

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.