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## Standard Terminology Relating to Protective Coating and Lining Work for Power Generation Facilities<sup>1</sup>

This standard is issued under the fixed designation D 4538; 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.

<sup>ε1</sup> NOTE—An editorial correction was made in the Discussion of definition sag or sagging in May 2009.

### 1. Scope

1.1 This terminology covers terms and their definitions relevant to the use of protective coatings in nuclear power plants.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

D 16 [Terminology for Paint, Related Coatings, Materials, and Applications](#)

D 1193 [Specification for Reagent Water](#)

D 3843 [Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities](#)

D 3911 [Test Method for Evaluating Coatings Used in Light-Water Nuclear Power Plants at Simulated Design Basis Accident \(DBA\) Conditions](#)

D 4227 [Practice for Qualification of Coating Applicators for Application of Coatings to Concrete Surfaces](#)

D 4228 [Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces](#)

D 4537 [Guide for Establishing Procedures to Qualify and Certify Personnel Performing Coating Work Inspection in Nuclear Facilities](#)

D 4787 [Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates](#)

D 5144 [Guide for Use of Protective Coating Standards in Nuclear Power Plants](#)

D 5161 [Guide for Specifying Inspection Requirements for Coating and Lining Work \(Metal Substrates\)](#)

D 5162 [Practice for Discontinuity \(Holiday\) Testing of Nonconductive Protective Coating on Metallic Substrates](#)

D 5962 [Guide for Maintaining Unqualified Coatings \(Paints\) Within Level I Areas of a Nuclear Power Facility](#)

#### 2.2 Other Documents:<sup>3</sup>

USNRC Regulatory Guide 8.8 [Ensuring Occupational Radiation Exposure ALARA at Nuclear Power Stations](#)

10CFR20.1 [Standards for Protection Against Radiation](#)

### 3. Terminology

**alligatoring**—*in protective coatings*, surface cracking of coating film having an appearance similar to alligator hide. acceptable coating or lining system, *n*—safety-related coating or lining system for which a suitability for application review that meets the plant licensing requirements has been completed and there is reasonable assurance that, when properly applied and maintained, the coating or lining will not detach under normal or accident conditions. **D 5144**

**certification**—*in protective coatings*, the written documentation of the qualification of personnel or material. ALARA, *n*—concept of reducing radiation exposure to personnel to levels “as low as reasonably achievable,” as defined in the USNRC Regulatory Guide 8.8 and 10CFR20.1(C). **D 5144**

**checking**—*in protective coatings*, the formation of slight breaks in a coating film that do not penetrate to the underlying surface. blistering, *n*—formation of bubbles in a coating (paint) film. See D 16 (take out “ability to resist”). **D 3911**

**coating applicator**—*in protective coatings*, an organization or individual responsible for applying a protective or decorative

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<sup>2</sup> Terminology D16, of Terms Relating to Paint, Varnish, Lacquer, and Related Products (Committee D01 on Paint and Related Coatings, Materials, and Applications).

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto: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 U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

- coating**, boiling water reactor (BWR), *n*—reactor in which the water moderator-coolant is boiled directly within the reactor core and the pressure in the reactor vessel is only slightly greater than the steam turbine pressure. **D 3911**
- coating system**—*in protective coatings*, a protective film consisting of one or more coats, applied in a predetermined order by prescribed methods. **certification**, *n*—written documentation of qualification.
- coating work**—*in protective coatings*, an all-inclusive term to define all operations required to accomplish a complete coating job; construed to include materials, equipment, labor, preparation of surfaces, control of ambient conditions, application of coating systems, and inspection. **checking**, *n*—slight breaks in the film that do not penetrate to the previously applied coating or to the substrate.
- cobwebbing**—*in protective coatings*, the formation of fine filaments (cobwebs) or partly dried coating, during spray application. **chemical spray**, *n*—solution of chemicals that could be used during a loss of coolant accident (LOCA) to suppress the incident, to scavenge fission products, and to return the facility to near-ambient conditions. **D 3911**
- cracking**—*in protective coatings*, the formation of breaks in a coating film that extend through to the underlying surface. **coating applicator**, *n*—organization or individual responsible for applying a protective or decorative coating. **D 3843**
- cratering**—*in protective coatings*, the formation of round depressions in a coating film that do not expose the previous coat or the substrate. **coating manufacturer**, *n*—organization responsible for manufacturing coating materials. **D 3843**
- crawling**—*in protective coatings*, a defect in which a wet coating film recedes from a small area to form an uneven surface shortly after application. **Coating Service Level I**, *n*—term used to describe areas inside the reactor containment where coating failure could adversely affect the operation of post-accident fluid systems and, thereby, impair safe shutdown. **D 5144**
- cr crazing**—*in protective coatings*, the formation of a criss-cross pattern of minute cracks on the surface of a coating film. **Coating Service Level II**, *n*—term used to describe areas outside the reactor containment where coating failure could impair, but not prevent, normal operating performance; the function of Coating Level II coatings is to provide corrosion protection and decontaminability in those areas outside the reactor containment subject to radiation exposure and radionuclide contamination and Service Level II coatings are not safety-related. **D 5144**
- Coating Service Level III**, *n*—term used to describe areas outside the reactor containment where coating failure could adversely affect the safety function of a safety-related structure, system, or component (SSC). **D 5144**
- coating system**, *n*—polymeric protective film consisting of one or more coats, applied in a predetermined order by prescribed methods. **D 3843**
- coating work**, *n*—an all-inclusive term to define all operations required to accomplish a complete coating job; the term shall be construed to include materials, equipment, labor, preparation of surfaces, control of ambient conditions, application and repair of coating systems, and inspection. **D 3843**
- coating work inspection**, *n*—phase of quality control that, by means of examination, observation, or measurement, determines the conformance of coating work to predetermined quality requirements. **D 4537**
- Code of Federal Regulations (CFR)**, *n*—rules and regulations of the U.S. Federal Government; the code is subdivided into titles, with Title 10 (10 CFR) applying to energy. **D 3843**
- cracking**, *n*—formation of breaks in a coating film that extend through to the underlying surface. **D 3911**
- crawling**, *n*—defect in which the wet film recedes from localized areas of the substrate (usually caused by insufficient wetting) leaving those areas uncoated. **D 16**
- curing**, *n*—transformation of a coating or other material into a solid phase or film. **D 3911**
- damp**, *adj*—moist but not visibly wet.
- delamination**—*in protective coatings*, a separation of one coat from another coat within a coating system; or from the substrate. **DBA qualified coating system**, *n*—coating system used inside reactor containment that can be attested to having passed the required laboratory testing, including irradiation and simulated design basis accident (DBA), and has adequate quality documentation to support its use as DBA qualified. **D 5144**
- deviation**—*in protective coatings*, a departure of a characteristic from established procedures or from specified requirements. **DBA unqualified coating system**, *n*—coating system used inside reactor containment that cannot be attested to having passed the required laboratory testing, including irradiation and simulated DBA or has inadequate quality documentation, or both, to support its use as DBA qualified. **D 5144**
- drips**—*in protective coatings*, the small drops of coating that collect on the edge of the coated work. **deionized water**, *n*—water prepared by an ion exchange process meeting the requirements of Specification D 1193, Types II and III. **D 3911**
- dry spray**—*in protective coatings*, a rough, powdery, non-coherent film produced when an atomized coating partially dries before reaching the surface. **delamination**, *n*—separation of one coat or layer from another coat or layer or from the substrate. **D 3911**
- exudation**—the migration of a substance to the surface of a coating or lining film. **design basis accident (DBA)**, *n*—generic term for any one of a family of accident conditions that can result from postulated events.
- DISCUSSION**—These conditions are generally associated with the rupture of high-energy piping. The more commonly recognized accident conditions used to evaluate coating systems for primary containment are the loss of coolant accident (LOCA) or main stream line break (MSLB). **D 3911**
- flaking**—*in protective coatings*, the detachment of small pieces of the coating film. **deviation**, *n*—departure of a characteristic from