



Standard Test Method for Determination of the Decontaminability of Coatings Used in Light-Water Nuclear Power Plants¹

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^{ε1} NOTE—Units of measurement statement and keywords were added editorially in October 1994.

1. Scope

1.1 This test method establishes procedures for determining and ranking the ease of decontaminability of coatings for use in nuclear power plants.

1.2 This standard defines two different test procedures involving differing contaminant contact times and decontaminating media. Procedure A involves a relatively brief radionuclide solution contact time and decontamination using both demineralized water and acid solutions. Procedure B utilizes a seven-day contamination solution contact time and decontamination with ambient temperature water only. Procedure B is more in line with power plant decontamination practices.

1.3 Users of this standard should specify either Procedure A or Procedure B, or both, based upon specific power plant conditions and use requirements.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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:

D 1193 Specification for Reagent Water²

E 522 Method of Calibrating Germanium Detectors for Measurement of Gamma-Ray Emission Rates of Radionuclides³

2.2 American National Standards Institute:⁴

N512 Protective Coatings (Paint) for the Nuclear Industry

3. Terminology

3.1 Definitions:

3.1.1 *decontaminate*—the removal of radionuclides from

a test panel using prescribed procedures.

3.1.2 *decontamination factor (DF)*—the ratio of the original radioactivity (dpm) to the radioactivity detected after treatment.

3.1.3 *disintegration of atomic nuclei*—the nuclear transformation characterized by the emission of one or more particles or photons from the nucleus.

3.1.4 *disintegrations per minute (dpm)*—the number of disintegrations occurring in a time period of 1 min.

4. Significance and Use

4.1 Day-to-day operation or a loss-of-coolant accident at a nuclear power plant can give rise to a significant level of radioactive contamination on the walls, floors, and attendant equipment. The ease with which the coated surfaces can be decontaminated could result in considerable reduction in the level of radioactive contamination, thereby mitigating the exposure to plant operating personnel. It is recognized that this test method does not duplicate actual field decontamination procedures, but it does represent comparative test procedures that have been in use for many years. Other tests, designed to be more meaningful in terms of real-life conditions, are under development.

5. Apparatus

5.1 *Radiation Detection Equipment*⁵—Use a gamma-sensitive system composed of the following items:

5.1.1 *Detector*—Use a germanium crystal detector with a resolution of 2.5 keV at 1332 keV or better.

NOTE—See Method E 522 for calibration methods.

5.1.2 *Photomultiplier-Amplifier*.⁶

5.1.3 *Analog-to-Digital Converter (ADC)*.⁷

5.1.4 *Pulse-Height Analyzer*, capable of resolving simple gamma-ray peaks shall be used.

5.2 Mount test specimens so as to give an optimum scanning geometry of the contaminated surface.

¹ This test method is under the jurisdiction of ASTM Committee D-33 on Protective Coating and Lining Work for Power Generating Facilities and is the direct responsibility of Subcommittee D33.11 on Decontamination of Coated Surfaces.

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² Annual Book of ASTM Standards, Vol 11.01.

³ Discontinued—see 1983 Annual Book of ASTM Standards, Vol 12.02.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁵ The most up-to-date information on gamma-ray detectors and accompanying electronics is found in manufacturers' literature. A list of vendors of this equipment can be found in compilations such as the *Guide to Scientific Instruments*, published by the American Association for the Advancement of Science, Washington, DC.

⁶ Tennelec Model TC-205, or equivalent, has been found satisfactory for this purpose.

⁷ Nuclear Data Model ND570, or equivalent, has been found satisfactory for this purpose.