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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Static Leaching of Monolithic Waste Forms for Disposal of Radioactive Waste[1]

This standard is issued under the fixed designation C 1220; 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 evaluates the relative chemical durability of simulated and radioactive monolithic waste forms such as glasses, ceramics, or cermets in various test solutions at temperatures <100°C under low surface-area-to-volume (S/V) ratio conditions.

1.2 This test method can be used to distinguish differences in the leaching behavior of various simulated or radioactive waste forms under the specific conditions of the test based on analysis of the test solution. Data from this test are used to calculate the normalized elemental mass loss from specimens exposed to aqueous solutions at temperatures <100°C.

1.3 Specimen surfaces may be altered during this test. These altered surfaces may be used to study the reaction of monolithic waste forms during static exposure to solutions.

1.4 This test method must be performed in accordance with all applicable quality assurance requirements for acceptance of the data.

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.* For a specific hazard statement, see 7.3.2.

2. Referenced Documents

2.1 *ASTM Standards:*

C 1109 Test Method for Analysis of Aqueous Leachates from Nuclear Waste Materials using Inductively Coupled Plasma-Atomic Emission Spectrometry[2]

C 1174 Practice for Prediction of the Long-Term Behavior of Waste Package Materials Including Waste Forms Used in the Geologic Disposal of High-Level Nuclear Waste[2]

D 1125 Test Methods for Electrical Conductivity and Resistivity of Water[3]

D 1129 Terminology Relating to Water[3]

D 1193 Specification for Reagent Water[3]

D 1293 Test Methods for pH of Water[3]

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods[4]

2.2 *EPA Document:*

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods[5]

3. Terminology

3.1 *Definitions:*

3.1.1 *accumulated dose*—the sum of the absorbed doses received by the system considered regardless of whether it is exposed to radiation in a continuous or discontinuous fashion.

3.1.2 *accuracy*—the closeness of agreement between the accepted reference value and individual results (Practice E 177).

3.1.2.1 *Discussion*—In its usage in this test method, *accuracy* includes the effects of precision and bias. The term is applied to measurements wherein a specific standard reference is available such as NIST standard mass and reference solutions traceable to a standards organization. The term "accurate to within" a specified range means that individual measurements on a reference standard are always within the specified range, for example, within 2°C of a certified NIST thermocouple, within 0.5 mg of a NIST standard mass or within 10 % of the value for a reference solution.

3.1.3 *actinide*—any element with atomic number of 89 to 103.

3.1.4 *bias of a measurement process*—a generic concept related to a consistent or systematic difference between a set of test results from the process and an accepted reference value of the property being measured (Practice E 177).

3.1.5 *chemical durability*—the resistance of a glass, ceramic, or cermet test specimen to the release of its constituents to an aqueous solution under the specific conditions of this test.

3.1.5.1 *Discussion*—The response of glass, ceramics, or cermets under other conditions is outside the scope of this test method.

3.1.6 *closed system*—a system that precludes the transport of matter into or out of the system.

3.1.7 *high-purity water*—ASTM Type I or Type II water with a maximum total matter content of 0.1 g/m^3, a minimum

[1] This test method is under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.07 on Waste Materials.

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[2] *Annual Book of ASTM Standards*, Vol 12.01.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] *Annual Book of ASTM Standards*, Vol 14.02.

[5] SW846A, 3rd Ed., Revision 1, U.S. Environmental Protection Agency, Washington, DC, December 1987.