Designation: C999 – 17

Standard Practice for Soil Sample Preparation for the Determination of Radionuclides[1]

This standard is issued under the fixed designation C999; 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 practice covers the preparation of surface soil samples collected for analysis of radionuclide constituents, particularly uranium and plutonium. This practice describes one acceptable approach to the preparation of soil samples for radiochemical analysis.

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

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 and health practices and determine the applicability of regulatory limitations prior to use.* A specific hazard statement is given in 7.3.

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]

C859 Terminology Relating to Nuclear Materials

C998 Practice for Sampling Surface Soil for Radionuclides

C1402 Guide for High-Resolution Gamma-Ray Spectrometry of Soil Samples

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Terminology

3.1 Except as otherwise defined herein, definitions of terms are as given in Terminology C859.

4. Summary of Practice

4.1 Guidance is provided for the preparation of a homogeneous soil sample from ten composited core samples (aggregate weight of 4 to 5 kg) collected as to be representative of the area.

5. Significance and Use

5.1 Soil samples prepared for radionuclide analyses by this practice can be used to characterize radionuclide constituents. This practice is intended to produce a homogeneous sample from which smaller aliquots may be drawn for radionuclide characterization.

5.2 Many soil characterization plans for radionuclide constituents utilize gamma-ray spectrometry measurements of soil to quantify a number of possible gamma emitting analytes. A widely used practice for these measurements is to fill a calibrated sample container, such as a Marinelli beaker (~600-mL volume), with a homogenized soil sample for counting such as what may be done using Guide C1402. By preparing the entire soil core collection, sufficient homogeneous sample is available for such gamma-ray spectrometry and other radiochemical measurements.

6. Apparatus

6.1 *Scale,* capacity of 10 kg.

6.2 *Drying Oven,* able to maintain ±2°C.

6.3 *Pans,* disposable aluminum.

6.4 *Jar Mill,* capacity for 7.57-L (2-gal) cans.

6.5 *Steel Cans and Lids,* 7.57-L (2-gal).

6.6 *Ceramic Rods,* 21 by 21-mm (13⁄16 by 13⁄16-in.) or steel grinding balls, 25.4-mm (1-in.) diameter.

6.7 *Sieve,* U.S. Series No. 35 (500-µm or 32 mesh).

6.8 *Plastic Bottles,* 7.57-L (2-gal).

[1] This practice is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycleand is the direct responsibility of Subcommittee C26.05 on Methods of Test.

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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.