



Standard Test Method for Analysis of Uranium and Thorium in Soils by Energy Dispersive X-Ray Fluorescence Spectroscopy¹

This standard is issued under the fixed designation C1255; 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 covers the energy dispersive X-ray fluorescence (EDXRF) spectrochemical analysis of trace levels of uranium and thorium in soils. Any sample matrix that differs from the general ground soil composition used for calibration (that is, fertilizer or a sample of mostly rock) would have to be calibrated separately to determine the effect of the different matrix composition.

1.2 The analysis is performed after an initial drying and grinding of the sample, and the results are reported on a dry basis. The sample preparation technique used incorporates into the sample any rocks and organic material present in the soil. This test method of sample preparation differs from other techniques that involve tumbling and sieving the sample.

1.3 Linear calibration is performed over a concentration range from 20 to 1000 µg per gram for uranium and thorium.

1.4 The values stated in SI units are to be regarded as the standard. The inch-pound units 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:²

- [C859 Terminology Relating to Nuclear Materials](#)
- [C998 Practice for Sampling Surface Soil for Radionuclides](#)
- [D420 Guide to Site Characterization for Engineering Design](#)

¹ This test method is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and 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.

- [and Construction Purposes \(Withdrawn 2011\)³](#)
- [D1452 Practice for Soil Exploration and Sampling by Auger Borings](#)
- [D1586 Test Method for Penetration Test \(SPT\) and Split-Barrel Sampling of Soils](#)
- [D1587 Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes](#)
- [D2113 Practice for Rock Core Drilling and Sampling of Rock for Site Investigation](#)
- [D3550 Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils](#)
- [D4697 Guide for Maintaining Test Methods in the User's Laboratory \(Withdrawn 2009\)³](#)
- [E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials](#)
- [E305 Practice for Establishing and Controlling Atomic Emission Spectrochemical Analytical Curves](#)
- [E456 Terminology Relating to Quality and Statistics](#)
- [E876 Practice for Use of Statistics in the Evaluation of Spectrometric Data \(Withdrawn 2003\)³](#)
- [E882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory](#)
- 2.2 *Other Document:*
 - [ANSI/HPS N43.2-2001 Radiation Safety for X-ray Diffraction and X-ray Fluorescence Equipment⁴](#)

3. Terminology

3.1 Definitions:

- 3.1.1 For definitions of terms relating to the nuclear fuel cycle, refer to Terminology [C859](#).
- 3.1.2 For definitions of terms relating to analytical atomic spectroscopy, refer to Terminology [E135](#).
- 3.1.3 For definitions of terms relating to statistics refer to Terminology [E456](#).

3.2 Definitions of Terms Specific to This Standard:

- 3.2.1 *escape peak*—a peak generated by an X-ray having energy greater than 1.84 keV (the energy of the k-alpha absorption edge for silicon) that enters the detector and causes

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.