



Designation: E181 – 17

Standard Test Methods for Detector Calibration and Analysis of Radionuclides¹

This standard is issued under the fixed designation E181; 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 These test methods cover general procedures for the calibration of radiation detectors and the analysis of radionuclides. For each individual radionuclide, one or more of these methods may apply.

1.2 These test methods are concerned only with specific radionuclide measurements. The chemical and physical properties of the radionuclides are not within the scope of this standard.

1.3 The measurement standards appear in the following order:

	Sections
Spectroscopy Methods:	
Calibration and Usage of Germanium Detectors	3 – 12
Calibration and Usage of Scintillation Detector Systems:	13 – 20
Calibration and Usage of Scintillation Detectors for Simple Spectra	16
Calibration and Usage of Scintillation Detectors for Complex Spectra	17
Counting Methods:	
Beta Particle Counting	25–26
Aluminum Absorption Curve	27 – 31
Alpha Particle Counting	32 – 39
Liquid Scintillation Counting	40 – 48

1.4 Additional information on the set-up, calibration and quality control for radiometric detectors and measurements is given in Guide [C1402](#) and Practice [D7282](#).

¹ These test methods are under the jurisdiction of ASTM Committee [E10](#) on Nuclear Technology and Applications.

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1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *This standard does not purport to address all of the safety problems, 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.*

1.7 *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 Document

2.1 ASTM Standards:²

[C1402](#) Guide for High-Resolution Gamma-Ray Spectrometry of Soil Samples

[D7282](#) Practice for Set-up, Calibration, and Quality Control of Instruments Used for Radioactivity Measurements

[D7283](#) Test Method for Alpha and Beta Activity in Water By Liquid Scintillation Counting

[E170](#) Terminology Relating to Radiation Measurements and Dosimetry

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.

SPECTROSCOPY METHODS

3. Terminology

3.1 Definitions: