



Designation: D5811 – 20

Standard Test Method for Strontium-90 in Water¹

This standard is issued under the fixed designation D5811; 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 determination of radioactive ⁹⁰Sr in environmental water samples (for example, non-process and effluent waters) in the range of 0.037 Bq/L (1.0 pCi/L) or greater.

1.2 This test method has been used successfully with tap water. It is the user's responsibility to ensure the validity of this test method for samples larger than 1 L and for waters of untested matrices.

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

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Section 9.

1.5 *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

- D1129 Terminology Relating to Water
- D1193 Specification for Reagent Water
- D1890 Test Method for Beta Particle Radioactivity of Water
- D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
- D3370 Practices for Sampling Water from Flowing Process Streams

¹ This test method is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.04 on Methods of Radiochemical Analysis.

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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.

- D3648 Practices for the Measurement of Radioactivity
- D4448 Guide for Sampling Ground-Water Monitoring Wells
- D5673 Test Method for Elements in Water by Inductively Coupled Plasma—Mass Spectrometry
- D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
- D6001 Guide for Direct-Push Groundwater Sampling for Environmental Site Characterization
- D7282 Practice for Set-up, Calibration, and Quality Control of Instruments Used for Radioactivity Measurements
- D7902 Terminology for Radiochemical Analyses

2.2 Other Documents:

- ANSI N42.22 Traceability of Radioactive Sources to the National Institute of Standards and Technology (NIST) and Associated Instrument Quality Control³
- BIPM-5 Decay Data Evaluation Project (DDEP)⁴
- NUDAT2⁵

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this standard, refer to Terminology D1129.

3.1.2 For definitions of terms used in this standard relating to radiochemical analysis, refer to Terminology D7902.

4. Summary of Test Method

4.1 This test method is based on the utilization of solid phase extraction of strontium from water samples with detection of the radioactive strontium by gross beta gas proportional counting.

4.2 An aliquant of the sample is measured into a beaker, strontium carrier added, digested with nitric acid, sorbed on an ion exchange column, eluted, evaporated to dryness, dissolved in nitric acid (8 M), selectively sorbed on a solid phase extraction column, eluted with dilute nitric acid, dried on a planchet. The sample test source (STS) is counted for beta radiation.

4.3 Fig. 1 shows a flow diagram for this test method.

³ Available from Institute of Electrical and Electronics Engineers, Inc. (IEEE), 445 Hoes Ln., Piscataway, NJ 08854-4141, <http://www.ieee.org>.

⁴ Available from BIPM, Sèvres Cedex, France, <https://www.bipm.org>.

⁵ Available from National Nuclear Data Center at Brookhaven National Laboratory, W Princeton Ave, Yaphank, NY 11980, <http://www.nndc.bnl.gov>.