



Standard Test Method for Alpha and Beta Activity in Water By Liquid Scintillation Counting¹

This standard is issued under the fixed designation D7283; 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 measurement of gross alpha- and beta- activity concentrations in a homogeneous water sample. It is applicable to alpha emitters with activity concentration levels above 0.11 Bq/L (3 pCi/L) and beta emitters with activity concentration levels above 0.15 Bq/L (4 pCi/L). This test method is not applicable to samples containing radionuclides that are volatile under conditions of the analysis.

1.2 This test method may also be used for the direct measurement of gross alpha- and beta- activity concentrations in homogeneous water samples with alpha emitter activity concentration levels above 1.8 Bq/L (50 pCi/L) and beta emitter activity concentration levels above 3.7 Bq/L (100 pCi/L).

1.3 This test method was tested using single-operator tests.^{2,3}

1.4 *Standard methods under the jurisdiction of ASTM Committee D19 may be published for a limited time preliminary to the completion of full collaborative study validation. Such standards are deemed to have met all other D19 qualifying requirements but have not completed the required validation studies to fully characterize the performance of the Test Method across multiple laboratories and matrices. Preliminary publication is done to make current technology accessible to users of standards, and to solicit additional input from the user community.*

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 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:⁴

- D1129 Terminology Relating to Water
- D1125 Test Methods for Electrical Conductivity and Resistivity of Water
- D1193 Specification for Reagent Water
- D1890 Test Method for Beta Particle Radioactivity of Water
- D1943 Test Method for Alpha Particle Radioactivity of Water
- D3370 Practices for Sampling Water from Closed Conduits
- D3648 Practices for the Measurement of Radioactivity
- D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water
- D4448 Guide for Sampling Ground-Water Monitoring Wells
- 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

2.2 Other Standards and Publications:

- EPA 900.0 Gross Alpha and Gross Beta Radioactivity in Drinking Water, from *Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (EPA-600/4-80-032)⁵
- Standard Methods 7110C Coprecipitation Method for Gross Alpha Radioactivity in Drinking Water⁶
- Standard Methods 8010E Table 8010: Recommended Composition for Reconstituted Fresh Water⁶

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 Wong, C. T., Soliman, V. M., and Perera, S. K., *Journal of Radioanalytical and Nuclear Chemistry*, Vol 264, No. 2, 2005, pp. 357–363.

³ Ruberu, S.R., Liu, Y.G., and Perera, S.K., *Health Physics*, Vol 95, No. 4, October 2008, pp. 397–406.

⁴ 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.

⁵ Available from United States Environmental Protection Association (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.

⁶ Available from American Water Works Association (AWWA), 6666 W. Quincy Ave., Denver, CO 80235, <http://www.awwa.org>.