



Designation: D7283 – 17

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} A collaborative study following the U.S. EPA “Protocol for the Evaluation of Alternate Test Procedures for Analyzing Radioactive Contaminants in Drinking Water” was performed. The results of this study are on file at ASTM Headquarters.⁴

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to pCi/L that are provided for information only and are not considered standard. An exception is noted in Section 14.

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 Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D19-1195. Contact ASTM Customer Service at service@astm.org.

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.

1.6 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:⁵

- 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
- D7902 Terminology for Radiochemical Analyses
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

⁵ 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.