



Designation: D 5072 – 98

Standard Test Method for Radon in Drinking Water¹

This standard is issued under the fixed designation D 5072; 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 radon in drinking water in concentrations above 0.04 Bq/L.

1.2 This test method may be used for absolute measurements by calibrating with a radium-226 standard or for relative measurements by comparing the measurements made with each other.

1.3 *This standard does not purport to address 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:*

D 1129 Terminology Relating to Water²

D 1193 Specification for Reagent Water²

D 2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D-19 on Water²

D 3370 Practices for Sampling Water from Closed Conduits²

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1129 and to other published glossaries.

4. Summary of Test Method

4.1 This test method is based on the scintillation counting of radon-222 and its daughters, a gaseous daughter product of radium-226.

4.2 An aliquot of unaerated water is drawn into a syringe then gently injected beneath 10 mL of liquid scintillation mix that does not contain an emulsifier. The vials are capped, shaken, and allowed to stand 3 h prior to counting. A commercial liquid scintillation counter is used to count the sample.

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 *Annual Book of ASTM Standards*, Vol 11.01.

5. Significance and Use

5.1 The most prevalent of the radon isotopes in ground water is radon-222. This isotope presents the greatest health risk compared to the other naturally occurring radon isotopes if ingested via the water pathway.

6. Interferences

6.1 Other radionuclides soluble in the scintillation mix may interfere. Water that is contaminated with high energy beta/gamma emitters, even though they are not soluble in the scintillation mix, may also interfere. These interferences would be rare in drinking water samples but may be observed in some cases.

7. Apparatus

7.1 *Sampling Funnel.*

7.2 *Tube*, with standard faucet fitting.

7.3 *Disposable Syringe*, 12 mL capacity, with 20 gage, 38 mm (1 in.) hypodermic needle.

7.4 *Glass Liquid Scintillation Vials*, 20 mL capacity with polyethylene inner seal cap liners.

7.5 *Liquid Scintillation Counter.*

8. Reagents and Materials

8.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

³ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.