ANSI/AARST **MW-RN 2020**

An Approved American National Standard

Protocols for the Collection, Transfer and Measurement of Radon in Water

AARST CONSORTIUM ON NATIONAL RADON STANDARDS

Introduction and Scope Summary

This standard of practice contains minimum requirements and guidance for measuring radon in water that enters a building through groundwater supplies for determining if mitigation is necessary to protect current and future occupants of dwellings and other buildings. This standard includes procedures for the collection and transport of water samples, as well as protocols for the quantitative transfer of the sample to a measurement device to determine radon concentrations in water.

Radon is the leading cause of lung cancer among nonsmokers and the second leading cause of lung cancer in the general population.[1] Elevated concentrations of radon in water can increase radon concentrations in indoor air. While an increased cancer risk may exist with ingestion of drinking water containing radionuclides over extended periods (e.g., decades), the risk from typical levels of waterborne radon is much lower than the risk from breathing indoor air containing ≥ 4 pCi/L (150 Bq/m^3). Radon in U.S. homes causes approximately 21,000 lung cancer deaths each year. Because at home, work or school, an individual's exposure to radon gas combines over time to increase the risk of preventable lung cancer.

In 1999, with publication of BEIR VI[2], the National Academy of Science confirmed that any exposure to radiation, including any concentration of radon, carries risk. In 2009, the World Health Organization's WHO Handbook on Indoor Radon confirmed the association between indoor radon exposure and lung cancer, even at the relatively low radon concentrations found in residential buildings.[1]

Designation of this standard: MW-RN

As used for catalogue identification, "MW-RN" stands for "Measurement of Water for Radon."

Normative References

ANSI/AARST MS-QA, Standard for Radon Measurement Systems Quality Assurance

The Consensus Process and Continuous Maintenance of Standards

The consensus process developed for the AARST Consortium on National Radon Standards and as accredited to meet essential requirements for American National Standards by the American National Standards Institute (ANSI) has been applied throughout the process of approving this document.

This standard is under continuous maintenance by the AARST Consortium on National Radon Standards for which the Executive Stakeholder Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Updated addenda and change request forms and instructions may be obtained in electronic form from at www.standards.aarst.org/public-review

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Notice of right to appeal: (See Bylaws for the AARST Consortium on National Radon Standards available at www.standards.aarst.org/public-review .) Section 2.1 of Operating Procedures for Appeals (Appendix B) states:

[1] World Health Organization, "WHO Handbook on Indoor Radon: A Public Health Perspective" 2009
[2] National Academy of Sciences, "Biological Effects of Ionizing Radiation" (BEIR VI Report) 1999

"Persons or representatives who have materially affected interests and who have been or will be adversely affected by any substantive or procedural action or inaction by AARST Consortium on National Radon Standards committee(s), committee participant(s), or AARST have the right to appeal; (3.1) Appeals shall first be directed to the committee responsible for the action or inaction."

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MW-RN Table of Contents

MW-RN
Protocol for the Collection, Transfer and Measurement of Radon in Water

SECTION 1.0 PURPOSE AND SCOPE

1.1 This standard of practice contains minimum requirements and guidance for measuring radon in water that enters a building through groundwater supplies for determining if mitigation is necessary to protect current and future occupants of dwellings and other buildings. This standard includes procedures for the collection and transport of water samples, as well as protocols for the quantitative transfer of the sample to a measurement device to determine radon concentrations in water.

This standard includes the U.S. EPA-accepted analytical methodologies, liquid scintillation and alpha-scintillation cells, along with essential information on use of electret ion chambers and acknowledgement of continuous radon monitors.

A structure for defining a national reference for *calibration* and quality control, in lieu of a federally-recognized reference, is provided, as well as recommended action levels and acknowledgement of current state-recommended action levels.

1.2 Limitations

1.2.1 This document is not intended to address all detailed technical aspects of measurement technology or quality assurance.

1.2.2 Analytical methods that may be in current use shall successfully complete *intercomparison* or proficiency tests prior to routine use and reporting of results.

1.2.3 While this consensus document provides current best practices, individual states may require alternate sample collection, transport, preparation, and/or analysis procedures. Adherence to this standard does not guarantee or supersede compliance with regulations of any federal, state, or local agency with jurisdiction where testing is performed.

1.2.4 Application of the procedures to matrices other than drinking water may produce adverse results.

1.3 Significance of use

This document is intended to aid water-supply owners/managers, residents and staff, professionals, state radiation control programs or anyone involved in the measurement of radon in water supplies to assess the need for mitigation and to provide radon risk information for the benefit of occupants.

This standard addresses the needs of citizens, radon service providers, property owners, residence/facility managers, consultants, manufacturers, and regulators concerned with proper radon measurements in groundwater supplies.

1.4 Applicability

1.4.1 The terms "Note" and "Informative Advisory" indicate provisions considered helpful or good practice, but which do not contain a mandatory requirement.

1.4.2 These standards of practice can be adopted as requirements for contractual relationships or adopted as recommendations or requirements of an authority or jurisdiction such as for private proficiency programs, a state radon program, or other governmental body.