ANSI/AARST **MAH 2019**

An American National Standard

Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes

AARST CONSORTIUM ON NATIONAL RADON STANDARDS
www.radonstandards.us

MAH 2019 Introduction
Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes

Scope Summary

This standard of practice specifies procedures and minimum requirements for measuring radon concentrations in single-family residences for determining if radon mitigation is necessary to protect current and future occupants. This standard applies to homeowners, professionals and any other party seeking to determine if radon *mitigation* is necessary for real estate or non-real-estate purposes.

Sections 1-7 are directed at anyone conducting radon tests. Additional requirements in Sections 8-9 are directed at those conducting radon tests in association with professional services.

Limitations—This standard does not address all technical aspects of measurement device technology, quality assurance or techniques to specifically identify radon sources such as radon in water supplies, building materials or relative to the possession and handling of radioactive materials.

Purpose

Radon is the leading cause of lung cancer among nonsmokers and the second leading cause of lung cancer in the general population.[1] Most people receive their greatest exposure to radon in their homes. Radon in U.S. homes causes approximately 21,000 lung cancer deaths each year.[2] Be it at home, work or school, an individual's exposure to radon gas combines over time to increase the risk of preventable lung cancer.

Historical Perspective

In the 1950s, studies confirmed increased incidence of radon-induced lung cancer for workers in underground mines. In the 1980s, studies found that exposure to radon in homes can exceed exposures found for mine workers. This discovery resulted in the Indoor Radon Abatement Act (1988) that authorized U.S. state and federal activities to reduce citizen risk of lung cancer caused by indoor radon concentrations. Since 1988, the United States Environmental Protection Agency (USEPA) and the U.S. Surgeon General have recommended that all homes be tested for radon.

In 1999, with publication of the BEIR VI[2] study, 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]

Measurement standards developed to respond to the threat of cancer caused by radon:

MAH *Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes*

MAMF *Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings*

MALB *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools / Large Buildings*

MS-PC *Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air*

MS-QA *Radon Measurement Systems Quality Assurance*

These are complemented with ANSI/AARST radon mitigation standards: SGM-SF, RMS-MF and RMS-LB.

Designation of this standard: MAH

As used for catalogue identification, "MAH" stands for Measurement of Air in Homes.

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[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

Significant Changes in the 2019 Revision

This standard of practice first published in 2005 and its most recent publication as an American National Standard in 2014 builds upon protocols developed by EPA relative to EPA's "A Citizen's Guide to Radon" and "Home Buyer's and Seller's Guide to Radon" publications.

For 2019, improvements include:

1) Harmonization of structure and recent revisions from other ANSI/AARST measurement standards;
2) Improved clarity on the difference between guidance and mandatory requirements;
3) Companion Guidance with informational content that now includes guidance criteria for general inspection of installed *mitigation systems*; and
4) Improved clarity for:
   - Test durations and locations,
   - How to handle test results that disagree, and
   - Professional requirements for qualification, onsite documentation and reporting.

The Consensus Process

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.

Continuous Maintenance

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.

User Tools: User tools are posted online (www.RadonStandards.us) as they become available (such as templates for field notices, inspection forms, interpretations and approved addenda updates across time).

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Notice of right to appeal: Bylaws for the AARST Consortium on National Radon Standards are available at www.RadonStandards.us. Section 2.1 of Operating Procedures for Appeals (Appendix B) states, "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."

MAH Contents

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1.0 SCOPE AND PURPOSE

1.1 Scope

This standard of practice specifies procedures and minimum requirements when measuring radon concentrations in single-family residences for determining if radon *mitigation* is necessary to protect current and future occupants. This standard applies to homeowners, professionals and any other party seeking to determine if radon *mitigation* is necessary for real estate or non-real-estate purposes.

1.2 Limitations

1.2.1 This standard does not address all technical aspects of measurement devices, *quality assurance* or techniques to specifically identify radon sources such as radon in water supplies, building materials or relative to the possession and handling of radioactive materials.

1.2.2 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.

1.3 Applicability

1.3.1 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.

1.3.2 The terms "Note–" and "Informative Advisory" indicate provisions that are considered to be helpful or good practice but that do not contain a mandatory requirement.

Table of Contents for Topics Commonly of interest

2.0 INTRODUCTION—BEFORE YOU TEST

2.1 Which Homes Should Be Tested?

Informative Advisory—Any home on any parcel of land can have a radon problem. Testing is the only way to know.

Every home should be tested to include new and old homes; tightly sealed and drafty homes; and homes with or without basements or *crawl spaces*. Radon concentrations cannot be predicted based on state, local or neighborhood radon measurements.