ANSI/AARST

MALB 2014 *with 1/21 revisions*

An American National Standard

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

AARST CONSORTIUM ON NATIONAL RADON STANDARDS

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MALB 2014 rev.1-21

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

Scope Summary and Introduction

This standard of practice specifies procedures and minimum requirements when measuring *radon* concentrations in shared structures, or portions of shared structures, used for residential, non-residential or mixed use purposes[1] to determine if *radon mitigation* is necessary to protect current and future occupants. These protocols address low-rise and high-rise structures and procedures for testing whole buildings but also for testing only one or several individual rooms or dwellings within a shared building.

1/21 Revisions for 2021

This publication improves and harmonizes provisions to read the same in ANSI/AARST MAMF and ANSI/AARST MALB. The attached Companion Guidance includes an ***Introduction to Radon*** and ***Guidance for Building Managers***.
While recommended for immediate use, the effective date of this standard for compliance purposes is Sept. 1st, 2021.

Purpose

Radon is the leading cause of lung cancer among nonsmokers and the second leading cause of lung cancer in the general population.[2] Radon in U.S. homes causes approximately 21,000 lung cancer deaths each year.[3] This risk is largely preventable. Most people receive their greatest exposure to radon in their home dwellings. Radon concentrations in ground-contact apartments have been found to be similar to those in low-rise residential buildings located in the same area.[4] 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. Since the early 1990s, the U.S. Environmental Protection Agency (EPA) has advised all U.S. schools to test for radon and to reduce levels to below 4 pCi/L.

In 1999, with publication of the BEIR VI 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]

Designation of the standard: MALB

As used for catalogue identification, "MALB" stands for Measurement of Air in Schools and Large Buildings.

Normative References

ANSI/AARST MS-QA *"Radon Measurement Systems Quality Assurance"*

In regards to conducting *radon decay product (RDP)* measurements, ANSI/AARST MAH "*Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes*"

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[1] As point of reference, see the International Building Code (IBC) as published by the International Code Council.
[2] World Health Organization, "WHO Handbook on Indoor Radon: A Public Health Perspective" 2009
[3] National Academy of Sciences, "Biological Effects of Ionizing Radiation" (BEIR VI Report) 1999
[4] Swedish Radiation Protection Authority, "Radon in Estonia Dwellings, Stockholm" 2003; and Valmari, T, Arvela, T and Reisbacka, "Radon in Finnish Apartment Buildings, Radiation Protection Dosimetry" 2012

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*

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

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

The Consensus Process

The consensus process developed for the AARST Consortium on National Radon Standards and 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.standards.aarst.org/public-review) 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.standards.aarst.org/public-review. 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."

MALB/MAMF Table of Contents

MALB

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

Note—This publication harmonizes provisions to read the same in ANSI/AARST MAMF and ANSI/AARST MALB.

1.0 SCOPE AND PURPOSE

1.1 Scope

This standard of practice specifies procedures and minimum requirements when measuring *radon* concentrations in shared structures, or portions of shared structures, used for residential, non-residential or mixed use purposes[5] to determine if *radon mitigation* is necessary to protect current and future occupants. These protocols address low-rise and high-rise structures and procedures for testing whole buildings but also for testing only one or several individual rooms or dwellings within a shared building.

1.1.1 *Multifamily and other residential occupancies*

The protocols in this standard of practice address residential occupancies that include:

a) buildings having more than one attached dwelling or other occupied unit under the same ownership or designated maintenance or management authority;

b) buildings or structures, or a portion thereof that are used, for example, as apartment houses, dormitories, military congregate residences, fraternities and sororities, non-transient boarding houses, hotels, convents, monasteries, motels, and live/work units; and

c) multifamily structures that can include those with shared ownership or maintenance such as co-op units, townhouses, condominiums or vacation timeshare properties.

1.1.2 *Schools, commercial buildings and other non-residential occupancies*

The protocols in this standard of practice also address non-residential occupancies that include:

a) Educational occupancies including for religious and educational purposes through the 12th grade and day care facilities (Group E);

b) Business occupancies including for offices, training and educational facilities to include universities, professional services or service-type transactions (Group B);

c) Assembly occupancies including for civic, social or religious functions (Group A);

d) Factory occupancies including for fabrication or manufacturing, repair or processing (Group F);

e) High-hazard occupancies (Group H);

f) Institutional occupancies including those where people are cared for or live in a supervised environment such as under restraint or security, detained in a penal institution, or for medical, surgical, psychiatric, nursing and custodial care or for child care facility purposes (Group I); and

g) Mercantile occupancies including for the display and sale of merchandise, goods, wares or merchandise incidental to such purposes and accessible to the public (Group M).

1.2 Applicability

The terms "shall" and "required" indicate provisions herein that are mandatory for compliance with this standard. The terms "note", "informative", "should" and "recommended" indicate provisions that are considered to be helpful or good practice but that do not contain a mandatory requirement.

[5] As point of reference, see the International Building Code (IBC) as published by the International Code Council.