ANSI/AARST

SGM-SF 2017 *with 12/20 revisions*

An American National Standard

Soil Gas Mitigation Standards for Existing Homes

AARST CONSORTIUM ON NATIONAL RADON STANDARDS
www.standards.aarst.org

SGM-SF 2017 *with 12/20 revisions*

Soil Gas Mitigation Standards for Existing Homes

Scope Summary and Introduction

This standard specifies practices, minimum requirements and, general guidance for reducing soil gas entry into existing homes in order to mitigate occupant exposures to certain hazardous soil gases, including *radon* gas, chemical vapors and other hazardous gases. This standard of practice is applicable to residential structures to include: those not more than three stories above-grade in height, those often classified as single-family structures, and those that contain not more than four attached *dwelling* units on a contiguous foundation.

12/20 Revisions for 2021

This publication is the first in a series of mitigation standards updates that seek to harmonize and improve as many provisions as possible across ANSI/AARST SGM-SF, RMS-MF and RMS-LB. While recommended for immediate use, the effective date of this revised standard for compliance purposes is Sept. 1st, 2021.

Substantive changes: Continuous maintenance efforts have resulted in harmonized updates for most provisions in Sections 6, 7 and 8 for *active soil depressurization (ASD)* to read the same in RMS-LB (schools and large buildings), RMS-MF (multifamily buildings) and SGM-SF (existing homes).

Editorial changes: Reconciliation for harmonized order of content, informational renderings and page layout.

Significance of Purpose

Radon is the leading cause of lung cancer among nonsmokers and the second leading cause of lung cancer in the general population. 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.[1] 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.

The risk of adverse health effects from inhalation of toxic chemicals in the form of vapor or particulate matter can be significant. The level of concern depends upon the nature, frequency and duration of exposure to the chemical(s). Where *chemicals of concern* are present in soils adjoining a building, *mitigation* methods for chemical vapor concentrations in indoor air are similar.

This document contains minimum requirements and guidance designed to respond to the health threat of *radon* gas, chemical vapors and other hazardous soil gases.

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 in studies of mine workers.

Since 1988, the Indoor Radon Abatement Act has authorized U.S. state and federal activities to reduce citizen risk of lung cancer caused by indoor radon concentrations.

Since the early 1990s, USEPA has advised all U.S. schools to test for radon and to reduce levels to below 4 pCi/L[3].

In 1999, with the publication of BEIR VI[1], the National Academy of Sciences confirmed that any exposure to radon holds a degree of risk. In addition, the Academy's BEIR VII committee stated that 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 levels found in residential buildings.[2]

Initiated in 2010, the U.S. Federal Radon Action Plan (FRAP), followed by the National Radon Action Plan (NRAP), has highlighted an ultimate public health goal of eliminating preventable radon-induced cancer.

Designation: SGM-SF

As used for catalogue identification, "SGM-SF" stands for Soil Gas Mitigation in Single Family homes.

Normative References

Referenced publications, including those delineated as normative, are found in Appendix B.

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[1] National Academy of Sciences, "Biological Effects of Ionizing Radiation" (BEIR VI Report) 1999

[2] World Health Organization, "WHO Handbook on Indoor Radon: A Public Health Perspective" 2009

Adoption

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. AARST recommends that any authority or jurisdiction considering substantial modifications of this document as a condition of its use seek consensus within the consortium process at AARST Consortium on National Radon Standards prior to adopting a modified version. This provides the jurisdiction with a higher degree of expertise across diverse stakeholders and offers the Consortium on National Radon Standards an opportunity to update this document as appropriate.

Assessing Qualifications of Individuals

Compliance with all portions of this standard includes both entry-level and advanced knowledge and skill sets.

It is intended that:

1. Mitigation installers or interns be capable of tasks needed to install ASD systems (e.g., Sections 6, 7, and 8)
2. Qualified **radon** mitigation professionals be additionally capable of ASD design, oversight and tasks relative to single family residences (e.g., Sections 4, 5 and 8 through 11);
3. Qualified **soil gas** mitigation professionals be additionally knowledgeable of chemical vapor considerations (e.g., Sections 11, 13 and Appendix A); and
4. An additional level of knowledge and skill is needed for buildings more complex than single family residences and for design of most Non-ASD mitigation methods (e.g., Section 12).

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The Consortium 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 revisions, including procedures for timely consensus action on requests for change to any part of the standard. User tools are also posted online as they become available (such as templates for field notices, inspection forms).

For access to details: (www.standards.aarst.org/public-review)

Notices

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."

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Note—12/20 Revisions (Sections 1 -5 do NOT contain changed requirements)

1.0 SCOPE

1.1 This standard of practice specifies practices, minimum requirements and general guidance for reducing soil gas entry into existing homes in order to mitigate occupant exposures to certain hazardous soil gases, including *radon* gas, chemical vapors and other hazardous gases.

This standard of practice is applicable to residential structures to include: those not more than three stories above grade in height; those often classified as single-family structures[3]; and those that contain not more than four attached *dwelling* units on a contiguous foundation.

1.1.1 This standard of practice addresses a wide range of *mitigation* methods and additionally provides guidance for health and safety, system design, system installation, and ongoing stewardship.

1.1.2 This standard of practice is applicable to existing homes be they rented or owned, including timeshare properties.

1.2 Limitations

1.2.1 *Water and building materials*

This standard of practice does not specify *radon mitigation* practices associated with *radon* in water, building materials or other less common sources of *radon* gas.

1.2.2 *Outside air and combustible gas*

This standard does not address mitigating hazards from gases or substances in outside air and does not fully address all practices associated with *mitigation* of potentially combustible soil gases.

1.2.3 *Removal of contaminated source materials*

This standard does not address practices or techniques associated with removal of contaminated source materials, including:

a) chemically contaminated earth and groundwater within or immediately under a building;

b) capture, containment and disposal of chemically contaminated vapor or condensate; and

c) chemical products be they stored or associated with building materials.

1.2.4 *Attached dwellings*

This standard of practice does not specify all practices that may be appropriate when structures contain two or more attached *dwellings*. See ANSI/AARST RMS-MF *Radon Mitigation Standards for Multifamily Buildings* Section 8.3.5 and Section 10.4 regarding *collateral mitigation*.

1.2.5 *Jurisdictional compliance*

This standard does not contain all code or other requirements of the jurisdictions where the *mitigation* system is being installed. Although the provisions in this standard have been reviewed for potential conflicts with other regulatory requirements, adherence to this standard does not guarantee or supersede compliance with the applicable codes or regulations of any federal, state or local agency with jurisdiction.

1.2.6 *Safety*

This standard of practice is not intended to address all of the safety concerns associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices. It is the responsibility of the user of this standard to determine the applicability of regulatory limitations prior to use.

[3] As point of reference, see the International Residential Code (IRC) Section R101.2 .