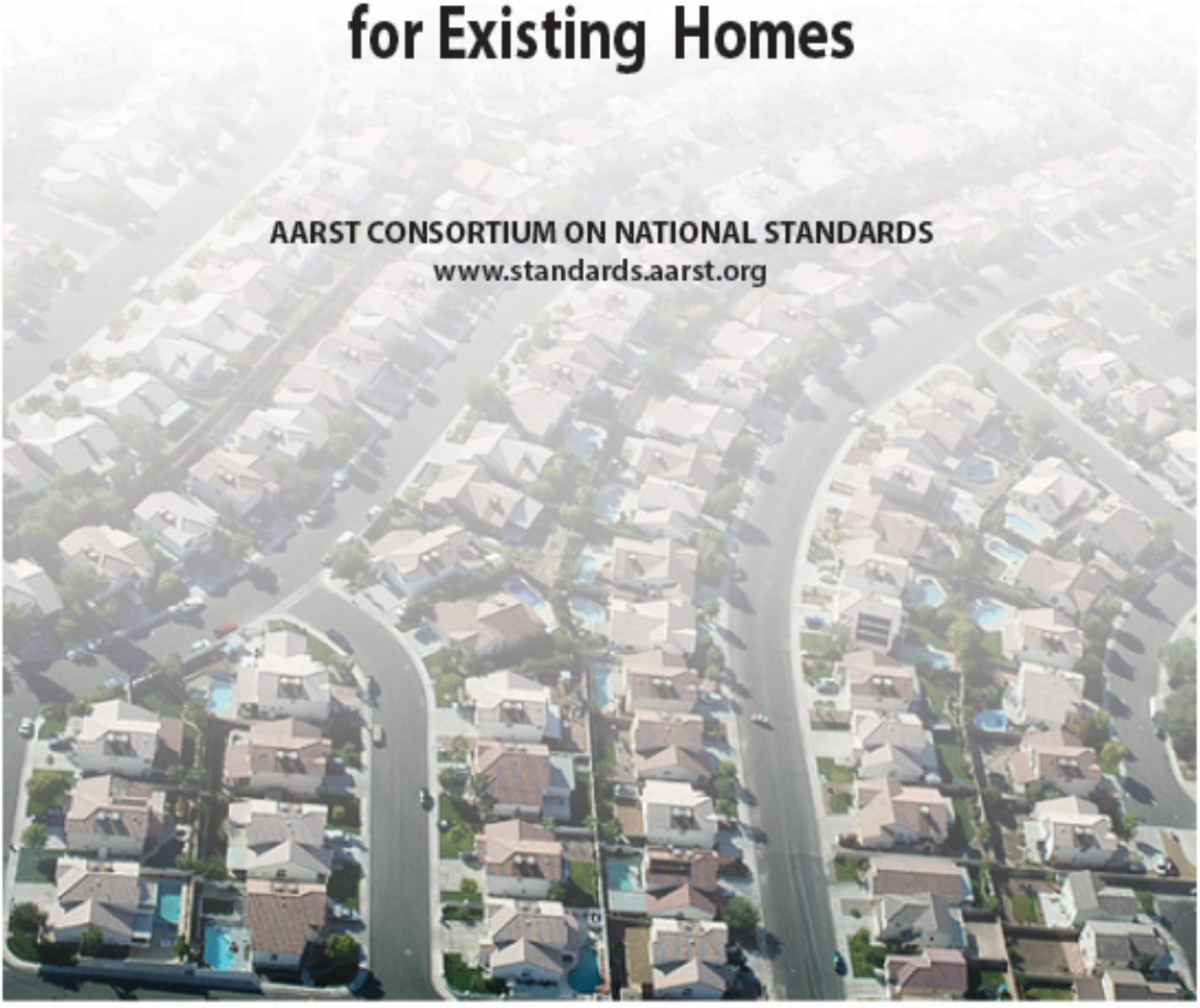
ANSI/AARST
An American National Standard

SGM-SF 2023

Soil Gas Mitigation Standards for Existing Homes

AARST CONSORTIUM ON NATIONAL STANDARDS
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SGM-SF 2023

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.

Updates for 2023

SGM-SF is now harmonized for interactive use with ANSI/AARST SGM-MFLB (Soil Gas Mitigation in Existing Multifamily, School, Commercial and Mixed-Use Buildings). These standards are now rendered in mandatory style where most guidance is not integrated into the body of the standard. This style is necessary to be recognized or adopted by many jurisdictions of authority. Because radon and vapor intrusion mitigation technologies are parallel technologies, provisions that differ are integrated within topics of both SGM-SF and SGM-MFLB and identified as applicable to the topic. While recommended for immediate use, the effective date for compliance with this standard is December 1st, 2023.

Note—SGM-MFLB consolidates ANSI/AARST RMS-MF (rev. 12/20) and ANSI/AARST RMS-LB (rev. 12/20) into a single publication. For clarity when reading, SGM-MFLB provides only:

a) content that is in addition to requirements already rendered in SGM-SF, and

b) content not normally associated with mitigation of homes.

Significance of Purpose

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

Radon: 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.

Vapor intrusion: 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.

Historical Perspective (Radon)

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. 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]

Normative References

National standards for materials, practices, and building codes are identified in Section 13.2 (Normative References).

Designation: SGM-SF

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

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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

Other ANSI/AARST standards developed to respond to the threat of cancer caused by radon:

ANSI/AARST MAH	(Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes)
ANSI/AARST MA-MFLB	(Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily, School, Commercial and Mixed-Use Buildings) *Note—Previously published as ANSI/AARST MAMF and MALB and now harmonized and consolidated into a single standard.*
ANSI/AARST MW-RN	(Protocol for the Collection, Transfer and Measurement of Radon in Water)
ANSI/AARST MS-QA	(Radon Measurement Systems Quality Assurance)
ANSI/AARST MS-PC	(Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air)
ANSI/AARST CC-1000	(Soil Gas Control Systems in New Construction of Multifamily, School, Commercial and Mixed-Use Buildings)
ANSI/AARST CCAH	(Reducing Radon in New Construction of One & Two Family Dwellings and Townhouses)
ANSI/AARST RRNC	(Rough-in of Radon Control Components in New Construction of 1 & 2 Family Dwellings and Townhouses)

The Consensus Process

The consensus process developed for the AARST Consortium on National 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 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), such as exhibit templates for field notices, inspection forms and, across time, interpretations, and approved addenda updates.

AARST Consortium on National Standards

Website: www.standards.aarst.org Email: StandardsAssist@gmail.com

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Notice of right to appeal: Bylaws for the AARST Consortium on National 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 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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Companion Guidance *(Instructions)*

For this PDF, guidance is accessed by clicking on the word "**Note**" where present to the right of text.

The information contained in this interactive guidance is not part of this ANSI/AARST American National Standard (ANS) and does not contain requirements necessary for conformance to the SGM-SF standard. Portions of this guidance have not been subjected to public review or a consensus process.

Vapor Intrusion Companion Guidance

A	Understanding Chemical Exposure	CG-VI 1
B	Guidance for Teams	CG-VI 2
C	Monitoring Events and Stewardship	CG-VI 5
D	Installation Guidance/Advisories	CG-VI 10

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SGM-SF
Soil Gas Mitigation Standards for Existing Homes

1.0 SCOPE

1.1 This standard of practice specifies minimum requirements for methods that *mitigate* risks to occupants posed by the presence of *radon gas* and chemical vapors or gas in existing homes. This standard of practice is applicable to existing low-rise residential structures often classified as single-family structures and individual *dwellings* within a shared structure that contain no more than four attached *dwelling* units on a contiguous foundation.

1.2 Limitations

1.2.1 *Source materials*

This standard does not address practices associated with characterization, possession, handling, containment, generation, or disposal of radioactive or chemically contaminated materials.

1.2.2 *Mitigation methods*

This standard of practice addresses nearly all methods that reduce occupant exposure to *radon* or chemical vapors and gas in indoor air. However, it does not specify requirements related to removal or encapsulation of radioactive or chemical sources.

This standard does not specify requirements for practices related to:

a) removal of *radon gas* or chemicals from water or outdoor air;

b) biological or chemical methods that seek to neutralize toxicity of contaminated soil; and

c) soil vapor extraction (SVE), including contaminant capture and disposal methods.

Informative advisory—Active soil gas depressurization (ASD) methods prescribed in this standard *mitigate* occupant risk by preventing soil gas entry into occupied spaces. These designs need only address soil gas volumes that would otherwise intrude into a building. SVE designs that extract volatile organic compounds (VOC) mass from the soil are not designed to mitigate the current risk to occupants unless also demonstrating functional performance as required in Section 9 (Post-*mitigation*).

1.2.3 *Combustible gas*

This standard of practice does not address all practices that may be needed for *mitigation* of potentially combustible soil gases.

1.2.4 *Jurisdictional compliance*

This standard of practice does not contain all code or other requirements of the jurisdictions where the *mitigation* system is installed. Adherence to this standard does not guarantee or supersede compliance with the applicable codes or regulations of any federal, provincial, state, or local authority having jurisdiction.

1.2.5 *Safety*

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

1.2.6 *Design and warranties*

This standard of practice is not a complete design manual. Compliance with its provisions will not guarantee reduction of indoor radon or soil gas to any specific concentration.