Note—ANSI/AARST RMS-MF and RMS-LB consolidated into a single publication

ANSI/AARST SGM-MFLB 2023



An American National Standard

Soil Gas Mitigation Standards for existing Multifamily, School, Commercial and Mixed-Use Buildings



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SGM-MFLB 2023

Soil Gas Mitigation Standards for Existing Multifamily, School, Commercial and Mixed-Use Buildings

Scope Summary and Introduction

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 multifamily, school, commercial and mixed-use buildings. This standard addresses most all mitigation methods for mitigating radon and other soil gas hazards.

Updates for 2023

SGM-MFLB is now harmonized for interactive use with ANSI/AARST SGM-SF (Soil Gas Mitigation in Existing Homes).

SGM-MFLB consolidates radon mitigation standard published as 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.

While recommended for immediate use, the effective date for compliance with this standard is December 1st, 2023.

Note 1—These harmonized standards also are 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.

Note 2—Because radon and vapor intrusion mitigation technologies are parallel technologies, provisions that differ are integrated within topics of both SGM-SF and SGM-MFLB are identified as applicable to the topic.

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 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]

Normative References

National standards for materials, practices, and building codes are identified in Section 13.3 (Normative References).

Designation: SGM-MFLB

As used for catalogue identification, "SGM-MFLB" stands for Soil Gas Mitigation in Multifamily and Large Buildings.

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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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SGM-MFLB - 2023

Table of Contents **Page**

1.0	Scope	1
2.0	Applicability	
2.1	Mandatory Conventions	2
2.2	Prior Systems	2
2.3	Use	2
3.0	Qualified Contractors	
3.1	Contractors/Team Qualifications	3
3.2	Radon Mitigation Professionals	3
3.3	Soil Gas Mitigation Professionals	3
3.4	Quality Management	3
4.0	General Practices	
4.1	Assemble Building Information	4
4.2	Proposals	4
4.3	Notification and Hazards	4
4.4	Jurisdictional Authorities	5
5.0	System Design	
5.1	Appropriate Systems	5
5.2	Nondestructive Investigation	5
5.3	Diagnostic investigation	10
5.4	Seasonal Compensation	12
5.5	Decisions (informative)	12
	Design Decision Flowcharts	13-14
6.0	ASD System Installations	15
7.0	Sealing	16
8.0	For All Systems and Methods	16
9.0	Post-mitigation	
9.1	Functional Evaluations (All Methods)	18
9.2	Radon Test After Mitigation	19
9.3	Testing for COC	19
10.0	Documentation	
10.1	Long-Term Plan for OM&M Required	20
10.2	Owner-Occupied Maintenance	20
10.3	Non-ASD Systems	20
10.4	Independent Maintenance	20
10.5	OM&M Manuals	20
10.5.1	*Stewardship*	20
	a) Stewardship Statement	20
	b) Owner/Management Changes	20
	c) Radon Tests/Inspections	21
	d) Chemical Vapor Measurements	21
10.5.2	*Historical information*	22
10.5.3	*System components*	22
10.5.4	*Maintenance inspection checklists*	22
10.5.5	*Repairs*	22
10.5.6	*Retention of OM&M records*	22
10.6	Inadvertent Collateral Mitigation	23
11.0	Health and Safety	24
12.0	Non-ASD Systems and Methods	
12.1	General	25
12.2	Sources for Air Delivered	25
12.3	Indoor Air Pressurization	28
12.4	Soil Air Pressurization	29
12.5	Indoor Air Dilution	30
12.6	Soil Air Dilution	31
12.7	Passive Methods and Systems	32
12.8	Air Cleaning	33
12.9	Water	33
12.10	Building Materials	34
12.11	Source Removal	34
13.0	Normative Appendices	
13.1	National Certification Programs	35
13.2	Temporary Systems/Rapid Response	37
13.3	Referenced Publications	39
14.0	Description of Terms	40

Exhibit A	Notices (Before Entering Building)	43-45
Exhibit B	Posted Warning Notice (Caulk)	46
Exhibit C	Temporary Label / Risk Chart	47

Consensus Body Members

SGM-MFLB Companion Guidance		
Sect. A	Guidance To Property Owners	1-2
Sect. B	HVAC Group Descriptions	3-4
Sect. C	Average Operating Conditions	5-6
Sect. D	ASD Maintenance Schedule/Log	7
Sect. E	HVAC Maintenance Schedule/Log	8
Sect. F	HVAC Basic Inspection Checklist	9
Sect. G	HVAC Diagnostic/Repair Checklist	10-11

Soil Gas Mitigation Standards for Existing Multifamily, School, Commercial and Mixed-Use Buildings

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 multifamily, school, commercial and mixed-use buildings. [3]

1.1.1 *Multifamily*

This standard of practice is applicable to a wide range of multifamily buildings including, among others, buildings or structures, or a portion thereof used as townhouses, apartment houses, convents, dormitories, military congregate residences, fraternities and sororities, and boarding houses, hotels, live/work units, monasteries, motels, and vacation timeshare properties.

1.1.2 *Schools and office buildings*

This standard of practice is applicable to a wide range of schools and office buildings including, among others, the use of a building or structure, or a portion thereof for: Business occupancies (Group B) including for offices, educational and training facilities, professional services or service-type transactions; and Educational occupancies (Group E) including for religious and educational purposes through the 12th grade and day care facilities.

1.1.3 Commercial and mixed-use buildings

The scope of this standard also includes: Assembly occupancies (Group A) including for the gathering of persons for purposes such as civic, social or religious functions; Factory occupancies (Group F) including for fabrication or manufacturing, repair or processing; High-hazard occupancies (Group H); Institutional occupancies (Group I) including for where people are cared for or live in a supervised environment be it under restraint or security, detained in a penal institution, or for medical, surgical, psychiatric, nursing, custodial care or for child care facility purposes; and, Mercantile occupancies (Group M) including for the sale of merchandise, goods, wares or merchandise incidental to such purposes and accessible to the public.

1.2 Limitations

(As replicated in ANSI/AARST SGM-SF)

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 of practice 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.

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