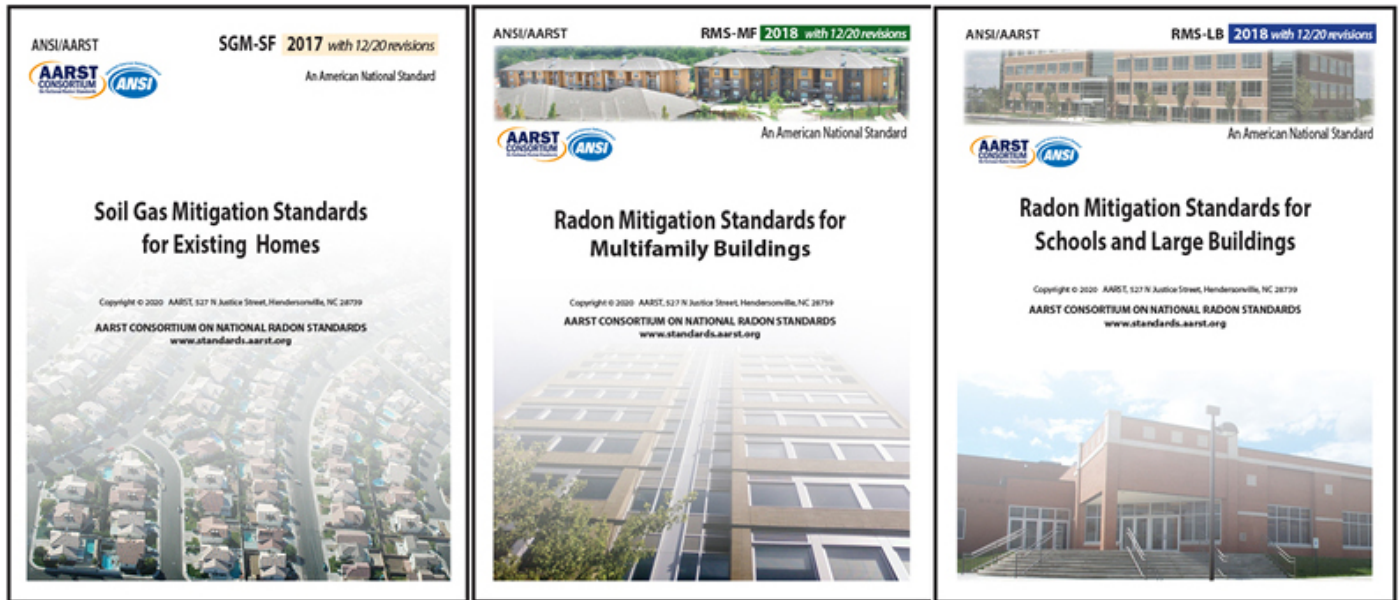


Harmonization effort for
SGM-SF, RMS-MF and RMS-LB Mitigation Standards
Continuous maintenance efforts to improve these standards are currently ongoing.



Read me

The work attached contains a *collection of proposed revisions* for harmonization compared to what is currently published in *rev. 12/20 publications of: SGM-SF (existing homes); RMS-MF (existing multifamily buildings) and RMS-LB (existing schools and large buildings).*

Some revisions, where specifically noted in commentary notes, modify content based on previous public comments.

The latest published versions of these standards are available for comparison at www.standards.aarst.org where all ANSI/AARST standards can be found for review at no charge and for purchase.

The current mitigation standards committee roster (consensus body) can be linked to from www.standards.aarst.org/public-review. The current work project includes (1) harmonization, where possible, for all portions of these documents to read the same for the same tasks; (2) update based on new experiences, and (3) renderings that are more conducive to stakeholders who are involved in compliance assessment.

Public Review: Collected MIT Revisions **07-22**
COMMENT DEADLINE: Sept 5th, 2022

REQUESTED PROCESS AND FORM FOR FORMAL PUBLIC REVIEW COMMENTS

Submittals (MS Word preferred) may be attached by email to StandardsAssist@gmail.com

- 1) Do not submit marked-up or highlighted copies of the entire document.
- 2) If a new provision is proposed, text of the proposed provision must be submitted in writing. If modification of a provision is proposed, the proposed text must be submitted utilizing the strikeout/underline format.

3) For substantiating statements: Be brief. Provide abstract of lengthy substantiation. (If appropriate, full text may be enclosed for project committee reference.)

REQUESTED FORMAT

Title of Public Review Draft: **Collection MIT Revisions 07-22**

- **Name:** _____ **Affiliation:** _____

- **Clause or Subclause:** _____

- **Comment/Recommendation:** _____

- **Substantiating Statements:** _____

- [] Check here if your comment is supportive in nature and does not require substantive changes in the current proposal in order to resolve your comment.

Repeat the five bullet items above for each comment.

Requested registration of your contact information and copyright release.

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Name: _____ Affiliation: _____
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PLEASE FAX TO (913) 780-2090 or SHIP TO: StandardsAssist@gmail.com Commenters are responsible for informing the standards assistant staff a when changing contact information or other preferences.

Notice regarding unresolved objections: While each committee seeks to resolve objections, please notify the committee responsible for an action or inaction if you desire to recirculate any unresolved objections to the committee for further consideration. Notice of right to appeal. (See Bylaws for the AARST Consortium on National Radon Standards - Operating Procedures for Appeals available at www.radonstandards.us, Standards Forum, Bylaws): (2.1) 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.

AARST Consortium on National Radon Standards

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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 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).

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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5.0 SYSTEM DESIGN

5.1 Appropriate Systems

5.2 Nondestructive Investigation

Commentary/Rationale: This revision to Section 5.2 clarifies procedures relative to ground water that can be potentially hazardous or contributor to vapor intrusion; and other reporting other hazardous of failed systems.

5.2.2.3 Potentially Contaminated Water

Where the purpose of the *mitigation* includes chemical vapor intrusion, the *contractor* shall document and provide timely notice to the *client* regarding components identified in Table 5.2.2.3.

Table 5.2.2.3 Potentially Contaminated Water	
a) Sumps/Pits	Observance of sumps or pits that are open to soil
	If closed and the nature of sump lids or pit covers
	If the pit receives surface water from floors or walls
	The destination of water drained or discharged by pumps
b) Water Intrusion	Presence of ground water on the surface of floors, walls or in crawl spaces

5.2.3 Reporting unexpected conditions

The *contractor* shall provide the *client* timely notice of suspected or unexpected conditions revealed during visual investigations, diagnostics or installation that can significantly impact occupant health, budgets, schedules or other concerns relative to the scope of work.

5.2.3.1 The *contractor* shall document and provide immediate or timely notice to the *client* regarding:

- a) hazardous materials or conditions observed but not previously reported to the contractor by the client; and
- b) observations of failed or deficient water control systems, to include observance of standing water in a basement or crawl space; evidence of groundwater intrusion; and failed pumps or sump systems and any pipes that inappropriately discharge or leak contaminants.

5.3 Diagnostic investigation

Commentary/Rationale: This section clarifies procedures integral to characterizing conditions that relate to pipe size for airflow capacity, fan airflow and vacuum capacity and potential needs for additional suction points or when balancing multiple suction points.

5.3.3 All mitigation methods

Where the purpose of *mitigation* includes chemical vapor intrusion and for *mitigation* of multifamily, school, commercial and mixed-use buildings, *diagnostic analysis* shall be conducted prior to final design and installation.

Commentary/Rationale: The next sentence and Section 5.3.1.1 are proposed only for RMS-MF and RMS-LB but NOT SGM-SF.

Where such *mitigation* projects include multiple homes, buildings or portions of buildings that are *like structures*, provisions in Section 5.3.1.1 are permitted after completing *diagnostic analysis* for a representative sample of each *like structure* associated with the project.

5.3.1.1 Like Structures

Buildings or portions of a building that resemble each other in size, age, building materials, construction practices, surrounding soils and ventilation system design(s) shall be categorized as *like structures*. For *like structures*, information gained at one structure regarding the needed air volume rate, vacuum or pressure strength and other vital operational parameter are permitted to be applied to designs in other *like structures*.

To exercise this option, requirements in a) and b) of this Section 5.3.1.1 shall be met prior to release of the *mitigation* effort for post-*mitigation* testing of indoor or soil gas concentrations.

- a) Jobsite logs shall include information that supports like conditions exist; and
- b) Jobsite logs shall include the results of test procedures that validate like conditions exist, to include:
 1. For ASD, post-*mitigation* PFE performance testing in accordance with Section 9.1; and
 2. For non-ASD methods, testing procedures required in Section 12, as applicable to the *mitigation* method, that confirm like conditions exist.

Commentary/Rationale: The remaining content is applicable to SGM-SF, RMS-MF and RMS-LB.

5.3.1 Targeted focus (all methods)

The initial target of design and any *diagnostic* investigations shall prioritize locations that would *mitigate* occupant exposure to the largest volume of soil gas that is susceptible to migrate into the building.

Exceptions: Where it has been determined that a foundation area is a source of disproportionately more concentrated volumes of *radon*, chemical vapors or flammable gas; or where it has been determined that soil gas is not the source of the hazard.

5.3.1.1 Target Limits

It is not required that diagnostic procedures or mitigation methods be applied to all *ground-contact* portions of a building. The percentage of area targeted for *mitigation* compared to size the full building footprint shall be recorded in jobsite logs or identifiable in jobsite diagrams. Diagnostic characterizations shall not be reported as being homogenous across any other individual foundation or building area unless verified.

5.3.2 Diagnostic and performance test conditions (all methods)

Jobsite log records shall include outdoor temperature and the status of heating, cooling or mixed HVAC operating conditions, at the time when conducting diagnostic or performance test measurements. Jobsite logs shall also indicate whether or not the testing was conducted, as is recommended:

- a) with all exterior windows and doors, including garage doors, closed; and
- b) with normal occupied indoor temperatures of between 65° and 80° F (18° - 27° C).

5.3.4 Non-ASD methods

All non-ASD systems and methods shall comply with Section 12.

Where installing ASD style systems with an inverted fan to pressurize rather than depressurize soil air, the design shall comply with Section 12.4 *Soil Air Pressurization*.

Commentary/Rationale: This revision is to clarify procedures integral to characterizing conditions that relate to pipe size for airflow capacity, fan airflow and vacuum capacity and potential needs for additional suction points or when balancing multiple suction points.

5.3.5 ASD diagnostic analysis

Where required, *diagnostic analysis* shall include evaluations as required in a), b), c) and d) of this Section 5.3.5.

a. PFE Distance (Qualitative)

With vacuum applied at the chosen suction point, evidence shall be sought to characterize the distance PFE can be achieved across the targeted *soil gas collection plenum(s)*. The pilot hole or test port locations shall be at locations that will best characterize:

1. The full expanse of the targeted *soil gas collection plenum(s)*; or
2. As an alternative or supplement, other locations where evidence suggests that large volumes of soil gas are susceptible to enter the building as a result of indoor air pressures.

Where PFE is not demonstrated across the majority of the targeted *soil gas collection plenum(s)*, further investigation is required.

b. PFE Vacuum (Quantitative)

Once goals for PFE distance are met, measurements shall be made to quantify air pressure differences under the slab or membrane relative to indoor air. Jobsite log records shall include the values measured in this effort to characterize vacuum strength needed for ASD design. The measurements shall be made with a micromanometer or equivalent differential pressure gauge that is capable of reading to 1/1000 inch water column (0.25 Pa).

c. Exhaust Air Volume (Quantitative)

Once goals for both PFE distance and vacuum strength are met, the volume of air exhausted to achieve desired PFE, as measured in *cfm* (m^3/min), shall be recorded in jobsite logs. Fans chosen and duct pipe configurations, in accordance with Section 6.3, shall be capable of transporting this volume of air and maintaining desired pressure.

d) Whole System Vacuum

The vacuum within the *main trunk* duct piping on the negatively pressured side of the fan shall be measured and recorded in jobsite logs.

5.3.5.1 Exception

Where PFE test locations or test ports cannot be created due to building materials that are virtually irreplaceable, such as for historical preservation properties, or due to denied access to locations of interest, a complete PFE analysis is not required. To exercise this exception, jobsite log records shall include the reason why and alternative locations or methods used for verifying design effectiveness.

5.4 Seasonal Compensation

Jobsite logs shall confirm that a comparison was made between:

- a) diagnostic test conditions, as recorded for compliance with Section 5.3.3, and
- b) the *normal occupied building operating condition* that prevails during the greatest amount of time each year for local buildings

5.4.1 Vapor intrusion

Because it is not possible to predict worst case conditions based on a single measurement or diagnostic event: Where assessments or indoor measurements indicate chemical vapors or other hazardous gas poses *acute* or *subchronic* risks, it shall be recommended to *clients* that designs address a means consistently monitor if the system is meeting *mitigation* goals.

Note—Reference to studies for alternative ways to help reasonably predict worst case conditions will be informationally cited.

Commentary/Rationale: These proposed revisions address additions and changes relative to responsible care for chemically contaminated ground water and where membranes over soil are regularly traversed for storage or other purposes.

7.5 Sumps and Pits

7.5.4 Chemically contaminated water

When *mitigation* goals include *mitigation of chemical vapor intrusion* and the *sump* needs to be installed or its discharge modified, *sump* water shall be handled and discharged to a destination as specified by a qualified environmental consultant.

7.6 Membranes Over Exposed Soil

The membrane material shall be not less than products that are nominally 6-mil (0.006 inch; 0.152 mm) in thickness. Where exposed soil areas are expected to be regularly traversed for storage or other purposes, membranes with tensile strength and puncture resistance to withstand anticipated loads shall be employed. Where a membrane will be exposed to sunlight, such as at window wells in a *crawl space*, the membrane shall be resistant to UV degradation.

Exception: Where running mats or other protective materials are installed to protect the membrane where trafficked; where heavy items are stored; or where exposed to sunlight.

Commentary/Rationale: These proposed revisions clarify minimum requirements, relative to needs of soil gas control systems, when securing and sealing membranes over open earth. Portions of this proposal are in response to public review comments.

7.7 Sub-Membrane Depressurization (SMD)

7.7.3 SMD—Securing the membrane

Soil gas retarder membranes shall be mechanically fastened to foundation walls or footings and at structural supports. All outer edges of the membrane shall be secured by materials and methods that, for the life of the system, are capable of withstanding anticipated loads that might pull or tear the membrane away from walls or other surfaces. Any wood installed as part of a *mitigation* system that directly contacts masonry or soil, such as when employed to secure a membrane, shall be resistant to decay and insects or otherwise protected.

7.7.4 SMD—Sealing the membrane perimeter

The entire perimeter of the sub-membrane *soil gas collection plenum* shall be sealed or closed in a manner to resist soil gas movement between the soil and air above the membrane using caulk that complies with ASTM C920 class 25 or higher, or alternative materials or methods that provide similar performance.

Commentary/Rationale: Retention of electrical provisions as currently published in SGM-SF, RMS-MF and RMS-LB

8.3 Electrical

The electrical service for ASD Fans shall comply with the following provisions in addition to all other electrical code requirements.¹

8.3.1 *Disconnect required*

For ASD fans, a means of electrical disconnect shall be provided for in the line of sight and within 6 feet (1.8 m) of the mitigation system fan(s).

Exception: A switch remote from the fan location shall be permitted when concerns sufficiently warrant preventing inadvertent deactivation of the fan.

8.3.2 *Labels required (disconnects)*

Labeling shall comply with **Section 8.4.5**.

8.3.3 *Protection from shock*

All outdoor wiring for ASD fans shall be protected in conduit, unless otherwise permitted by local code, and shall not be a plug disconnect.

8.3.4 *Not allowed*

Wiring shall not be located in or chased through the ASD duct piping.

¹ As required by local statutes. For further information, see the National Electric Code® (NEC) as published by NFPA.