Harmonization effort for

SGM-SF, RMS-MF and RMS-LB Mitigation Standards

*Continuous maintenance efforts to improve these standards are currently ongoing.*


Read me

**This work contains proposed revisions for harmonization across Section 6, 7 and 8 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).**

These latest published versions 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 conductive to stakeholders who are involved in compliance assessment.

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## Public Review: 678 *01-22*

## *COMMENT DEADLINE:* **February 28th 2022**

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**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: **678 01-22**

- **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 <u>each</u> comment.***

**Requested registration of your contact information and copyright release.**

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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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527 N Justice Street, Hendersonville, NC 28739

### 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."

## 6.2 *ASD* Piping

6.2.5 *ASD pipe materials*

Rational/Commentary: This proposal addresses harmonization by simply moving various *vapor intrusion* specifications into sections of the document(s) where the specifications are applicable.

6.2.5.1 Vapor Intrusion Piping

When ASD goals include mitigation of chemical vapor intrusion, all duct pipe materials shall meet specifications in ASTM D1785 for Schedule 40. For alternatives to plastic pipe identified in Section 6.2.5:

a) An evaluation shall be made prior to installation for alternative materials such as iron, steel, copper or other pipe materials, relative to corrosive effects that chemicals may have, and

b) Downspout materials shall not be permitted.

6.2.7 *Secure duct piping*

Rational/Commentary: This proposal clarifies the quality of durability needed.

6.2.7.1 Duct piping shall be fastened ~~securely~~ to the structure of the building with hangers, strapping or other supports that will ~~and durably secure the duct material. To~~ ~~durably~~ withstand ~~natural~~ forces such as wind, ice and other forces or degradation over time. ~~, requirements include:~~ The fastening system shall comply with requirements in a), b), c) and d) of this Section 6.2.7.1.

a) Mechanical hardware or fasteners shall be durable for the purpose and weather-rated when employed outdoors;

b) The anchoring method and fastening materials shall be suitable to secure the anchors in a durable manner to whatever building surface is chosen for securing the duct piping;

c) Existing plumbing pipes, ducts or mechanical equipment shall not be used to support or secure duct piping; and

d) Fastening systems that rely only on extending a nail or screw through the duct piping and into a wall or other supporting surface shall not be used to secure duct piping.

Rational/Commentary: This section has been rewritten and moved to Section 5.1 (Design)

~~6.2.8 *Unnecessary noise*~~

~~Duct piping, fans and support configurations shall be installed in a manner that minimizes transfer of vibration to the structural framing of the building.~~

~~Suction pipe openings, such as under membranes and in *non-habitable airspaces,* shall be configured to minimize unnecessary objectionable air-rushing noise if the noise can be heard inside occupiable spaces.~~

~~Note – Section 6.3.8 *Air Velocities* provides guidance on air-rushing noise at the *point of exhaust*. Common methods to reduce other objectionable air-rushing noise, such as under a membrane, include:~~

~~a) reducing the size of air inlet pipe openings (if air volume flow of the duct pipe is greater than needed to establish a vacuum);~~

~~b) extending perforated pipe under a membrane or into a *non-habitable airspace* to allow the same air volume to enter more slowly through dozens of slits or holes; and~~

~~c) altering whole system airflow (when pipe or fan are transporting significantly more air than needed to establish a vacuum in all airspaces being depressurized).~~

6.2.9 *Provide access clearance*

Duct pipe routing shall not:

a) block egress from entrances and exits to the building, including those designated for fire and safety;

c) compromise effectiveness of fire suppression systems; or

b) block any necessary access to any areas requiring maintenance or inspection such as mechanical equipment or a *crawl space*.

Rational/Commentary: This proposal addresses a needed label/notice for personnel to indicate that disassembly is allowed.

**Exception:** Flexible coupling disconnects or equivalent methods prescribed in Section 6.2.6 are permitted where allowed by code to provide access by temporary removal and airtight replacement of *ASD* pipe sections. Such configurations shall be marked or labeled "Removable for temporary access", or equivalent wording.

6.2.11 *Observe codes*

Rational/Commentary: This addition clarifies the need for compliance with code requirements that are informationally described immediately below this proposed sentence.

Compliance with codes of the jurisdiction having authority (JHA) to include utility company restrictions is required, including those related to maintaining the integrity of a buildings structural members; inhibiting the spread of fire and smoke; and proximity of piping relative to electrical components.

6.3.3 *When smaller air volume needs are verified*

Where *PFE* Analysis indicates the necessary airflow for the entire system is equal to or less than 40 *cfm* (1.1 $m^3$/min), 2-inch (50-mm) ID duct piping from the exhaust point to the *soil gas collection plenum(s)* is permitted.

Rational/Commentary: Objectional noise will be covered solely in Section 5.1

~~If airflow exceeds 40 *cfm* (1.1 $m^3$/min) due to fan pressures much stronger than normally employed, such as greater than 6 inches WC (1500 Pa), 2-inch (50-mm) ID pipe is only permitted if both:~~

~~a) The system still meets the needs for an appropriate design, as described in Section 5.3; and~~

~~b) Adequate air volume transport is achieved for establishing a vacuum within each airspace being depressurized.~~

6.4.1.2 Definitions

Definitions a), b), c) and d) of this Section 6.4.1.2 shall apply to exhaust requirements in Section 6.4:

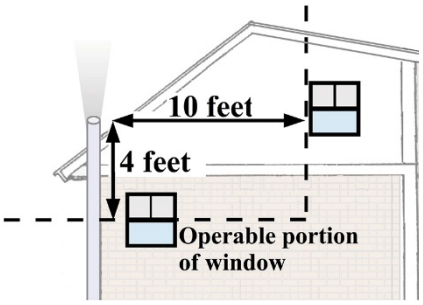
Rational/Commentary: This proposal adds clarify to previously publish requirements.

b) *Operable openings* The operable or constantly open portion of windows, skylights, doors and other openings designed to readily operate for increasing ventilation with outdoor air. Portions of a window specifically designed to temporarily open for cleaning are not considered readily operable for increasing ventilation with outdoor air;

6.4.6 *Separation from operable openings in structures*

The *point of exhaust* shall be compliant with Section 6.4.3 *Directional spread* and located ~~either~~:

a) not less than 10 feet (3 m) horizontally to the side of *operable openings* in structures; and




Rational/Commentary: This proposal addresses clarity for distance requirements.

~~b) not less than 4 feet (120 cm) above *operable openings* in structures~~

b) not less than 4 feet (120 cm) away from *operable openings* in structures that are below the *point of exhaust.*

6.4.10 *Roof*

The *point of exhaust* shall comply with Section 6.4.3 *Directional spread* and, unless all requirements of Section 6.4.11 are met, the *point of exhaust* shall be:

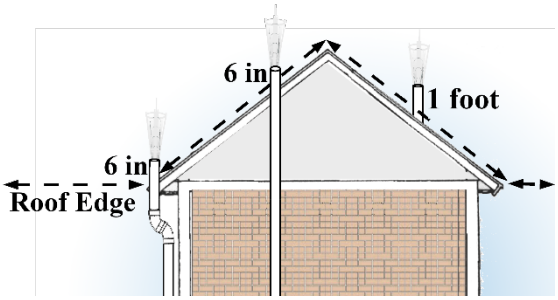
a) not less than 1 foot (30 cm) above a pitched roof at the point penetrated;

b) not less than 6 inches (15 cm) above the edge of the roof when *ASD* piping is attached to the side of a building;

c) not less than 18 inches (46 cm) above a flat roof; and

Rationale/Commentary: This proposal addresses clarity for distance and height requirements.

d) not less than 4 feet (120 cm) horizontally away from a vertical wall that extends above the roof edge.




Additional Pic Needed

6.4.11 *Below the roof*

The *point of exhaust* is permitted to be located below the edge of the roof if the configuration complies with all other requirements of Section 6.4 and requirements in a), b) and c) of this Section 6.4.11.

a) The justification for not locating the exhaust above the edge of the roof shall be recorded in the operations and maintenance plan and shall be based upon either:

1. the inability to comply with other requirements of Section 6.4 if the *point of exhaust* were located above the roof, or
2. the edge of the roof exceeds 20 feet (6m) above grade nearest to the *point of exhaust*;

Rational/Commentary: This proposal addresses clarity for distance requirements

b) ~~The *point of exhaust* shall be not less than 20 feet (6m) above grade nearest to the *point of exhaust* and not less than 4 feet (120 cm) directly below *operable openings* in structures; and~~

The *point of exhaust* shall be: compliant with Section 6.4.3 *Directional spread;* not less than 20 feet (6m) above grade nearest to the *point of exhaust;* and not less than 4 feet (120 cm) away from *operable openings* that are above the *point of exhaust*;

## 7.0 SEALING

### 7.2 Sealant Materials

Rational/Commentary: This proposal addresses harmonization by simply moving various *vapor intrusion* specifications into sections of the document(s) where the specifications are applicable.

7.2.6 *Vapor Intrusion sealants*

When *ASD* goals include *mitigation* of *chemical vapor intrusion*, the *contractor* shall advise the *client* if any sealant products used are known to have long curing periods or contain constituent chemicals identified in *mitigation* goals.

Note—Curing compounds, including constituent chemicals identified for *mitigation* that have not stabilized to a benign or minimal state, can corrupt post-*mitigation chemical vapor intrusion* tests.

7.5.1.1 Access

Rational/Commentary: This proposal addresses clarity on acceptable methods for removable ports

Where work includes installing, modifying or altering a sump cover for a pit that includes a *sump* pump, the *sump* cover shall include a removable handhole port or section of the lid no less than 4 inches (10 cm) in diameter ~~to~~ that allows physical access for routine verification that pumps are operational. The access port shall achieve open access and reclosure without the use of sealants, as can be achieved by way of friction fit or screw on caps, rubber grommets or equivalent methods. ASD suction pipe connections shall not be used for access ports.

### 7.6 Membranes Over Exposed Soil

Rational/Commentary: It was determined that all provisions required in ASTM E1745 are not always necessary.

7.6.1 ~~*Soil gas retarder material (membranes general)*~~

~~*Soil gas retarders* shall meet ASTM E1745 class A, B or C.~~

7.6.1 *Soil gas retarder material (membranes general)*

*Soil gas retarders* shall meet requirements for ASTM E1745 class A, B or C and be capable of withstanding anticipated loads.

Exception: Where the membrane material applied for radon mitigation is capable of withstanding anticipated loads that include occasional inspection and repair activity by workers or occupants.

Rational/Commentary: This proposal is to provide clarity for durable membrane materials.

7.6.1.1 *Anticipated loads/degradation*

The tensile strength of the membrane material shall be not less than products that are nominally 6-mil (0.006 inch; 0.152 mm) in thickness. Tensile strength and puncture resistance shall be greater, compared to 6 mil products, where exposed soil areas are expected to be regularly traversed for storage or other purposes. 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.

Rational/Commentary: This proposal addresses harmonization by simply moving various *vapor intrusion* specifications into sections of the document(s) where the specifications are applicable.

7.6.1.2 *Vapor intrusion (membranes general)*

The *contractor* shall account for the known chemical(s) of concern in relationship to manufacturer guidance on soil gas retarder materials to help ensure degradation of the material will not occur over time when in contact with the chemical of concern.

Rational/Commentary: These proposals enhance clarity regarding needs for mechanical fastening and closure of exposed soil.

~~7.6.6 *Securing the membrane*~~

~~The membrane shall be durably secured to the walls or other surfaces for *crawl spaces* or portions of a *crawl space* that are expected to be regularly accessed for maintenance, storage or other purposes.~~

~~7.6.7 *Wood components*~~

~~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 Sub-Membrane Depressurization (SMD)

In addition to all requirements in Section 7.6, *soil gas retarder* membranes associated with *SMD* shall be sealed and secured in accordance with Section 7.7.1 through Section 7.7.4 to result in a closed *soil gas collection plenum* under the membrane that resists air movement between soil and air above the membrane.

7.7.1 *SMD—Seams*

7.7.2 *SMD—Pipe penetrations*

~~7.7.3 *SMD—Walls and foundation supports*~~

~~Membranes attached to foundation walls and at penetrations for foundation support components shall be sealed in a manner to resist soil gas movement between the soil and air above the membrane, to include:~~

~~a) For flat wall surfaces, the membrane shall be sealed to the foundation walls and supports with a caulk complying with ASTM C920 class 25 or higher or equivalent method.~~

~~b) For irregular surfaces, alternative materials and methods are permitted so long as durable closure of the *soil gas collection plenum* is achieved.~~

7.7.3 *SMD—Securing the membrane*

Membranes over exposed soil shall be mechanically fastened to the walls or other surfaces at all *accessible* perimeter locations. Fastening materials and methods shall be capable of withstanding anticipated loads that might pull or tear the membrane away from walls or other surfaces.

Definition to Add: *Accessible*
Capable of being reached for operation, repair, and inspection

7.7.3.1 Fastening Materials/Methods

Materials and anchoring methods shall be capable of securing the membrane to whatever building surface is chosen and retaining functional integrity for the life of the system. 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.

When portions of the *crawl space* cannot be accessed or have insufficient height to work in a safe manner, as established by the Occupational Safety and Health Administration (OSHA) or other authorities, the edges of the membrane within the boundaries of accessible areas shall be closed.

Exception:

Where it can be demonstrated to be warranted, systems are permitted with a portion of the membrane edges unclosed. Such design shall meet any additional requirements in Sections 6.1.4 (*Non-habitable air spaces)* and Section 12.6 (*Soil gas dilution)*. Because this *mitigation* design inevitably combines sub-membrane *depressurization* (SMD), *crawl space depressurization* (CSD) or soil gas dilution, open membrane edges shall be disclosed to the *client(s)* in documentation along with justification for the design.

Rational/Commentary: This proposal reminds that system monitors need to be accessible.

8.2.3 *Required for all system monitors*

Requirements for all mechanisms or systems that monitor fan or airflow functionality include:

a) System monitors shall be *readily accessible* to individuals responsible for system maintenance without destructive or significant disassembly of building components or finishes.

Definition to add: *Readily Accessible*

Capable of being reached quickly for operation, repair, or inspections without requiring those to whom ready access is requisite to take actions such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth.

Rational/Commentary: This proposal adds clarity to needs for durable labels.

8.4.1 *Label materials and lettering*

All labels shall be made of durable materials that are capable of withstanding ambient conditions where mounted. All label lettering and other annotation on systems shall be of a color in contrast to the color of the background on which the lettering is applied. The minimum lettering size shall conform to requirements a) and b) of this Section 8.4.1.

Rational/Commentary: This proposal adds clarity to needs for labels in all portions of the building.

8.4.4 *Label duct piping*

Interior duct piping shall be marked with not less than one label at each floor level and within attics, garages and crawl spaces that portrays the system purpose, such as "Radon Reduction System" or "Soil Gas Control System."