



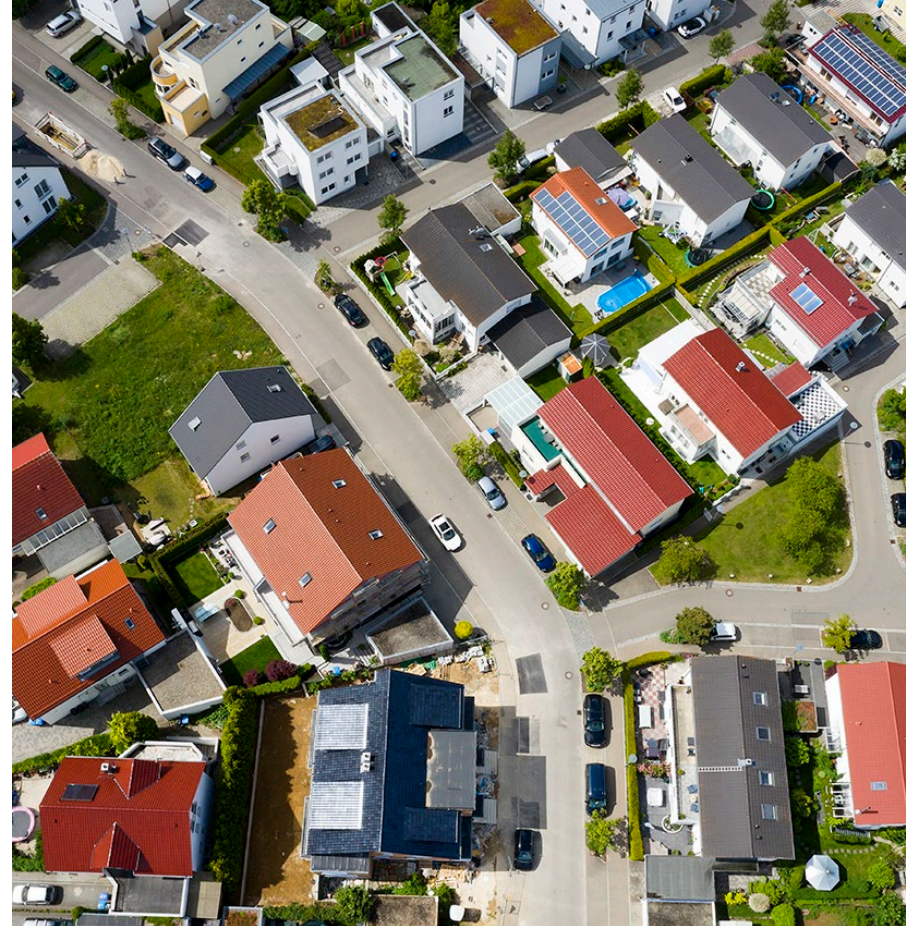
Revisions to the Soil Gas Mitigation Standards

Shawn Price

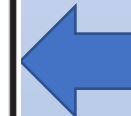
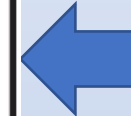
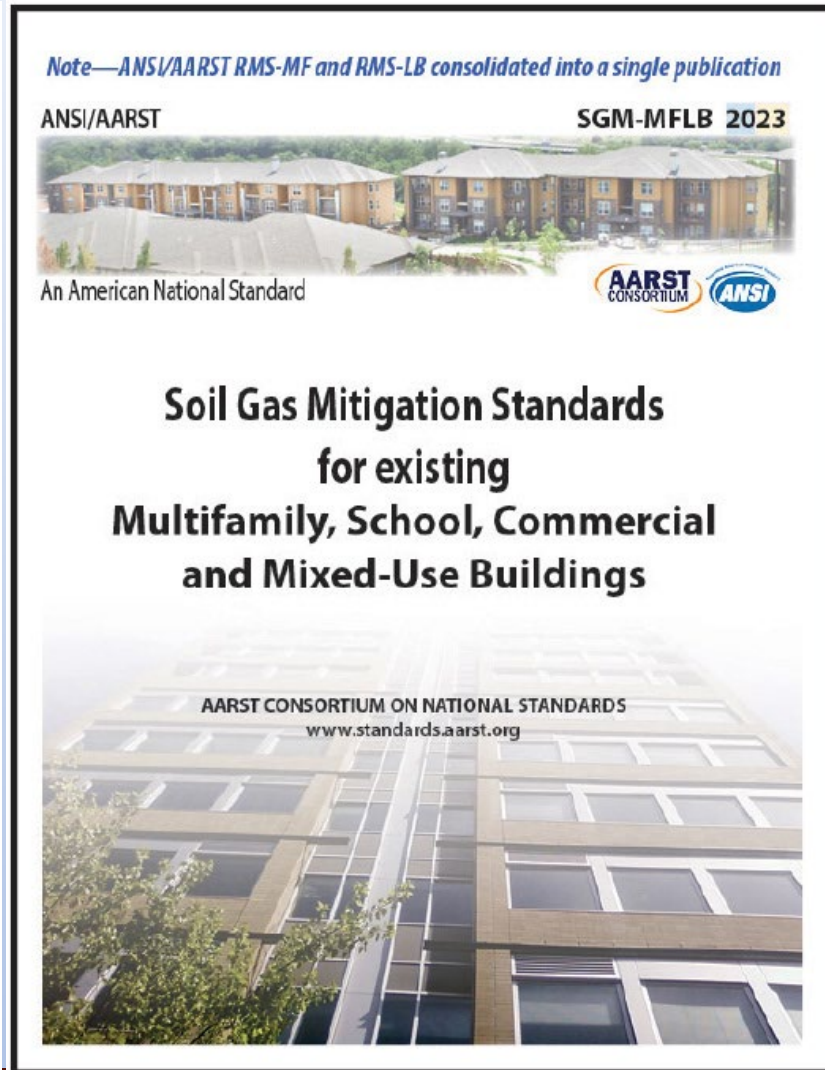
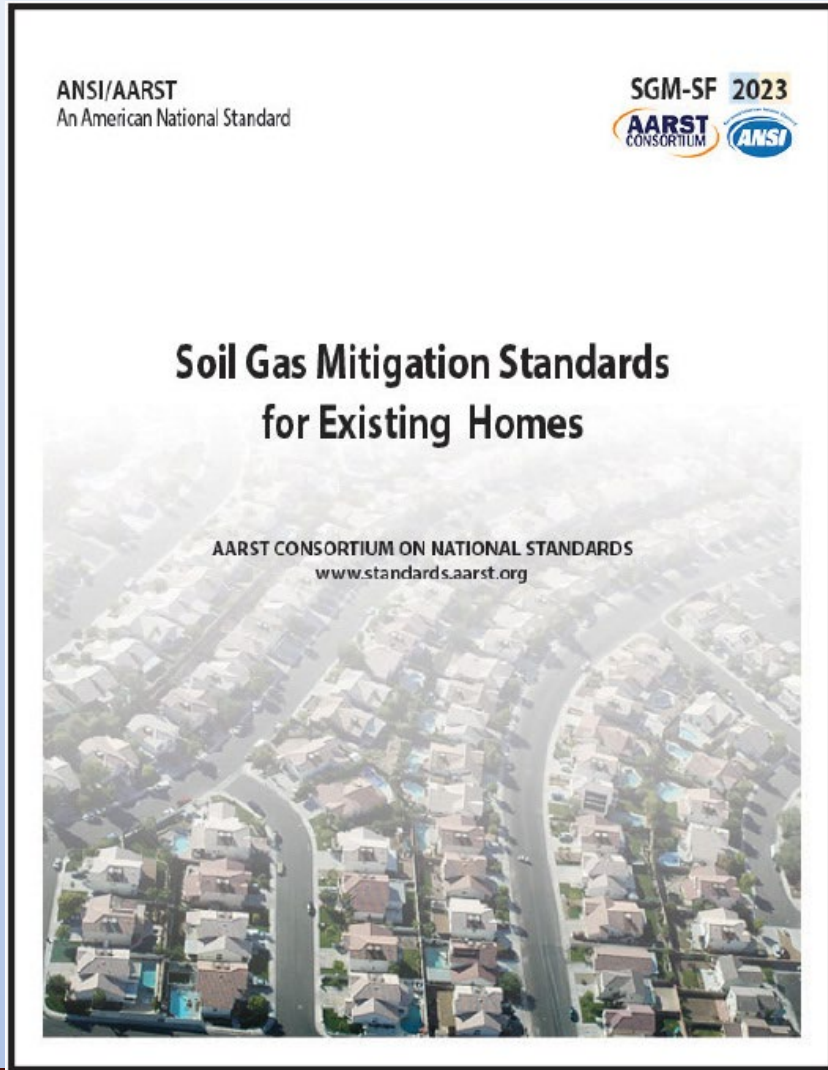
AARST Standards Management Council (SMC)

World-Leading Experts in ASD Techniques

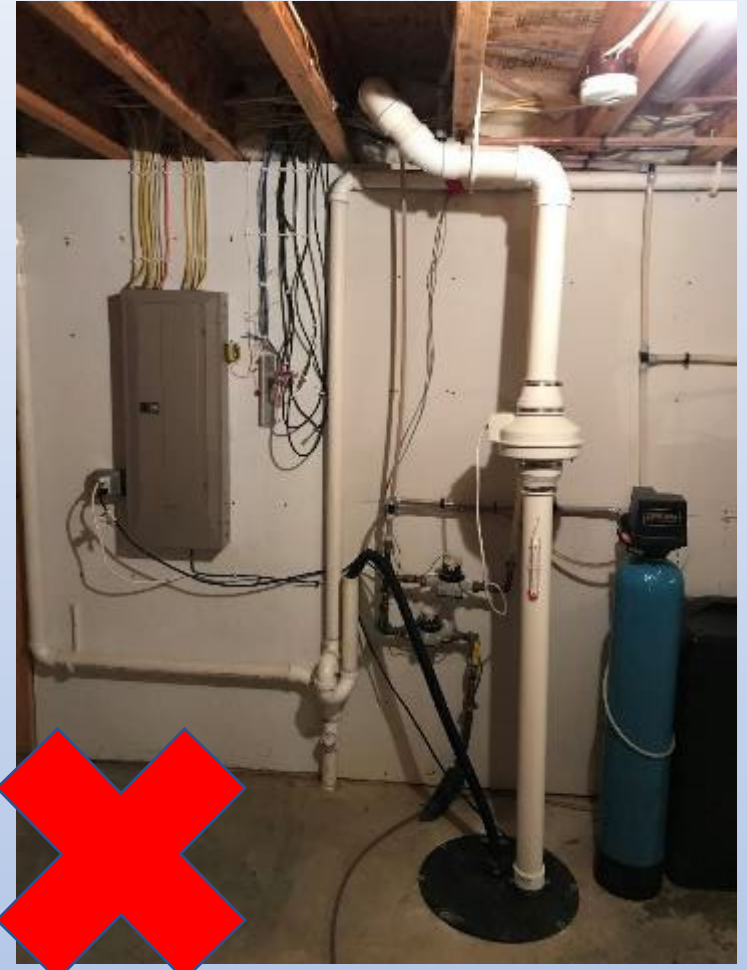
- Active Soil Depressurization (ASD) has been used to mitigate indoor radon in >2,000,000 buildings across the United States since 1985.
- Mitigators serving on the AARST committee over the years have likely installed more ASD systems than the rest of the world combined.
- Ventilation & sealing methods preferred in other countries are often used along with ASD in the US and Canada.
- Current Soil Gas Mitigation standards were designed primarily for radon mitigation.
- Chemical vapor intrusion (CVI) industry also uses ASD methods.
- SGM standards can be adopted and used for CVI, often by radon professionals, hired to spec out or install the systems.



Soil Gas Mitigation (SGM) Standards



When previously installed systems are repaired, ASD Exhaust Discharge and Safe Fan locations must meet current standards. (2.2.b)



Thank you, Dan Hylland, for the assist with content & pics!

4.2 Proposals

Contractors shall provide *clients* the following written information prior to initiation of the work:

- a) The Qualified Mitigation Professional's name, address and phone number; relevant *radon* or soil gas *mitigation* certification and/or licensing number; and signature (manual or electronic in conformance with the Electronic Signatures in Global and National Commerce [E-SIGN] Act);
- b) A description of the proposed *mitigation* system(s) and the elements of the applicable plan for long term *operation, maintenance, and monitoring (OM&M)*;
- c) A statement that describes options for initial post-*mitigation* testing, including the option of third-party testing;
- d) The conditions of a warranty concerning workmanship and defects in materials;
- e) A statement on whether the *contractor* guarantees that the proposed system(s) will or will not reduce *radon* or soil gas concentrations below a specified threshold and conditions or limitations of the guarantee; and
- f) Any other limitations that the *contractor* places on the scope of work and any limitations on professional obligations.

4.2.1 *Non-ASD designs*

As required in Section 12.1.4, *contractors* shall provide *clients* an estimate of total ownership costs including installation and annual operating costs where proposed designs **include Indoor Air Pressurization, Indoor Air Dilution and Soil Air Dilution mitigation methods.**



5.1.2 Other building systems

The *mitigation* system shall not:

- a) compromise the functionality of mechanical, groundwater control or drainage systems;
- b) compromise the functional integrity of roofs, guttering, siding, or other structural systems;
- c) obstruct doorways or operable windows; and
- d) obstruct accessibility to switches, controls, electrical service panels or junction boxes and other equipment, such as HVAC components, which require maintenance over time.



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



7.6 Membranes Over Exposed Soil

The membrane material shall be **not less than nominally 6-mil (0.006 inch; 0.152 mm) in thickness.**

7.6.1 *Durable for application*

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.

SGM 2017 with 12/20 revisions had required membranes to meet ASTM E1745 class A, B, or C.

ASTM E1745-17: *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*

9.0 POST-MITIGATION

9.1 Functional Evaluations

Upon completion of the *mitigation* effort, as installed or augmented, actions prior to releasing the work product for post-*mitigation* testing of indoor or soil gas concentrations shall comply with all portions of this Section 9.1 and Section 8.5 (Inspection for Compliance).

9.1.3 ASD systems

Once all sealing, piping and other components of the ASD system are complete, evidence relative to system performance shall be gathered as required in a), b) and c) of this Section 9.1.3.

a) *Depressurization Performance*

A minimum of one differential pressure measurement shall be made at a location distant from the suction point(s) with intent **to evaluate if depressurization has been achieved** within each targeted soil gas collection plenum. The term soil gas collection plenum shall include where subterranean pathways, such as voids or drain systems, are targeted as a primary source of soil gas entry.

The measurement shall be made using a differential pressure gauge that is capable of reading 1/1000-inch water column (.25 Pa) differences in air pressure. Jobsite log records of the event(s) shall include:

Depressurization Performance Requirements

- System running and all sealing complete
- Drill one test hole at a good location
- Check closed house conditions
- Take pressure measurement(s) at test hole through the floor
- Ensure manometer reading is **NEGATIVE**
- Document the reading in post-mitigation checklist
- Retain records/checklists for a minimum of 3 years



SGM Standard Revisions

- Clarifications & harmonization among all standards
- Responding to interpretations, change requests, continued improvement
- Better protection of consumers & professionals
 - *Documentation, materials, safety, sustainability, power consumption, defensibility, record retention*
- Consistency with other codes & standards (Electrical, Fire, ASHRAE, Plumbing)
- Improving usefulness for radon, VI, and other soil gas contaminants

Thank You Volunteers!

Mitigation Standards—Consensus Body 2019-2022

Chair: Steve Tucker (OR)

Assistance Team: Gary Hodgden (KS)

<u>Stakeholder Group</u>	<u>Delegate</u>	<u>Affiliation</u>
(Educators Rn)	Bill Angell (MN)	University of Minnesota
	Chad Robinson (KS) <i>Alternate</i>	Midwest University Radon Consortium (MURC)
(Regulated States Rn)	Josh Kerber (MN)	Minnesota Department of Health
	Patrick Daniels (IL) <i>Alternate</i>	Illinois Emergency Mgmt. Radon Program
(Federal EPA Rn)	Tommy Bowles (DC)	U.S. Environmental Protection Agency (EPA)
(Federal OHH)	Warren Friedman (DC)	HUD Office of Healthy Homes
(Proficiency Program)	Bruce Snead (KS)	AARST-NRPP (Policy Advisory Board)
	Kyle Hoylman (KY) <i>Alternate</i>	AARST-NRPP (Credentialing Committee)
(Measurement Prof. Rn)	Nate Burden (PA)	Professional Measurement Service Provider
	James Fraley (GA) <i>Alternate</i>	Professional Measurement Service Provider
(Home Mitigation Prof.)	Bill Brodhead (PA)	Professional Service Provider
	Aaron Fisher (PA) <i>Alternate</i>	Professional Service Provider
(Large Bldg. Mitigation)	Tony McDonald (OH)	Professional Service Provider
	Fred Elrott (CA) <i>Alternate</i>	Professional Service Provider
(VI Mitigation Prof.)	Tom Hatton (NJ)	Professional Service Provider
	Rachel Saari (MI) <i>Alternate</i>	Professional Service Provider
(Building Scientist)	Todd McAlary (CN)	Professional Service Provider
	Chris Ferguson (IN) <i>Alternate</i>	Professional Service Provider
(Site Assessment VI)	Chris Lutes (NC)	Professional Measurement Service Provider
	Chris Bonniwell (WI) <i>Alternate</i>	Professional Measurement Service Provider
(VI Stewardship VI)	David Gillay (IN)	Professional Legal Services
(Fan Manufacturers)	Dave Hill (MA)	Spruce
	Paul Owen (MA) <i>Alternate</i>	Spruce
(Ventilation Manufacturers)	Hamid Massali (KS)	Fantech
	Michelle Festa (PA) <i>Alternate</i>	Festa

Roster Outreach For 2024-2025 Committees

standards.aarst.org/public-review

- Educators
- Non-regulated States
- Regulated States Rn
- Regulated States VI
- Proficiency Programs
- Federal Rn
- Federal VI
- Public Health (NGO)
- Measurement Rn
- Measurement VI
- Mitigation Rn
- Mitigation VI
- Building Inspection
- Manufacturers
- Building Scientists
- Assessment VI
- OM&M

Update Schedules

Resources permitting, most standards are now planned for three-year review/update cycles.

Standing committees for each topic will be repopulated and each standard will be posted in whole for public review during the first year after publication.





Thanks To Our Partners





Thank you Gary, you made this all possible!