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An American National Standard



Soil Gas Mitigation Standards for Existing Homes

AARST CONSORTIUM ON NATIONAL RADON STANDARDS
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Acknowledgement

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SGM-SF 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.

Radon Mitigation: Practices for installing radon reduction systems shall comply with all provisions of this standard, with the exception of Sections 11 and 12.

Vapor Intrusion and Other Soil Gas Mitigation: Practices for installing systems to reduce hazards from chemical vapor intrusion and other gases shall comply with all provisions of this document, with the exception of Section 10.

Historical Perspective

This standard has engaged comprehensive harmonization of existing practices for mitigation in radon single-family residences with inclusion of specific enhancements applicable to mitigation of soil gas vapor intrusion.

Mitigation of soil gas entry to reduce occupant exposure to radon gas has a long history of maturing technology and success since before 1988, when the Indoor Radon Abatement Act authorized U.S. state and federal activities to reduce citizen risk of lung cancer caused by indoor radon concentrations.

Virtually the same technology has often been employed to protect citizens from hazardous exposures to chemical vapors that can intrude into buildings.

Initiated in 2010, the U.S. *Federal Radon Action Plan (FRAP)*, followed by the *National Radon Action Plan (NRAP)*, highlight an *ultimate* public health goal of eliminating preventable radon-induced cancer. The FRAP is the result of a collaborative effort led by the U.S. Environmental Protection Agency (EPA) with the U.S. Departments of Health and Human Services (HHS), Agriculture (USDA), Defense (DOD), Energy (DOE), Housing and Urban Development (HUD), Interior (DOI), Veterans Affairs (VA) and the General Services Administration (GSA). The NRAP, led by the American Lung Association, represents a collaborative effort between several federal and national organizations including AARST and the Conference of Radon Control Program Directors (CRCPD).

These efforts further revealed growing needs for updated and complete minimum standards of practice for radon mitigation in existing homes, including as they apply to chemical vapor intrusion.

Keywords

Radon, Radon Gas, Radon Mitigation, Radon Test, Vapor Intrusion, Soil Gas, Chemical Vapor Intrusion, VOC

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 of This Standard

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. The change submittal form and instructions may be obtained in electronic form from at: www.radonstandards.us.

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Notice of right to appeal: (See Bylaws for the AARST Consortium on National Radon Standards available at: www.RadonStandards.us 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."

Metric Conversions

Conversions from English-American measurement units to the International System of Units (SI) are rendered herein with literal conversion. The conversions are not always provided in informational text or tables. It is acknowledged that rounding off to a similar numeric conversion is common for locations where the International System of Units (SI) is used in standard practice (e.g., 4.0 pCi/L rounded to 150 Bq/m³ rather than literal conversion to 148 Bq/m³).

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SGM-SF Companion Guidance
Informational Guidance and Discussion

SGM-SF

Soil Gas Mitigation Standards for Existing Homes



SECTION 1: SCOPE

1.1 This standard of practice 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.

1.2 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 structures¹; and those that contain not more than four attached dwelling units on a contiguous foundation.² This standard of practice is applicable to existing homes be they rented or owned, including timeshare properties.

1.3 This standard of practice addresses a wide range of mitigation methods and additionally provides guidance for health and safety, system design, system installation, and ongoing stewardship.

SECTION 2: SIGNIFICANCE OF USE

2.1 Professionals

This standard of practice is intended for use by trained radon and/or vapor intrusion mitigation professionals in design, installation and ongoing stewardship for mitigation systems.

2.1.1 Radon mitigation and qualified individuals

Practices for installing radon reduction systems shall comply with all provisions of this standard with the exception of Sections 11 and 12.

Criteria for determining qualifications or credentials for a radon mitigation professional include demonstration of technical training and skills needed to comply with this standard with the exception of Sections 11 and 12.

2.1.2 Vapor intrusion mitigation and qualified individuals

Practices for installing systems to reduce hazards from chemical vapor intrusion shall comply with all provisions of this document with the exception of Section 10.

Criteria for determining qualifications or credentials for professionals who mitigate exposure to chemical vapor intrusion or other gases include demonstration of all qualification criteria associated with a radon mitigation professional and additional training and skills needed to comply with Sections 11 and 12 of this standard.

¹ As point of reference, see the *International Residential Code (IRC)* Section R101.2 and the *International Building Code (IBC)* Section 310 for Residential Group R3 (as published by the International Code Council).

² See *Radon Mitigation Standards for Multifamily Buildings* (ANSI/AARST RMS-MF) for buildings that have more than four attached dwellings.

2.2 Intended purposes

This standard of practice is intended to provide:

- a) minimum requirements and uniform standards that emphasize safety, system quality, and effectiveness in the design and installation of mitigation systems for existing homes; and
- b) a means to evaluate mitigation systems in existing homes.

2.3 Adoption

These standards of practice can be adopted as requirements for contractual relationships or adopted as recommendations or requirements of an authority or jurisdiction such as for private proficiency programs, a state radon program or other governmental body.

2.4 Limitations

2.4.1 Radon in water and building materials

This standard of practice does not specify radon mitigation practices associated with radon in water, building materials or other less common sources of radon gas.

2.4.2 Outside air and combustible gas

This standard does not address mitigating hazards from gases or substances in outside air and does not fully address all practices associated with mitigation of potentially combustible soil gases.

2.4.3 Removal of contaminated source materials

This standard does not address practices or techniques associated with removal of contaminated source materials, including:

- a) chemically contaminated earth and groundwater within or immediately under a building;
- b) capture, containment and disposal of chemically contaminated vapor or condensate; and
- c) chemical products be they stored or associated with building materials.

2.4.3 Attached dwellings

This standard of practice does not specify all practices that may be appropriate when structures contain two or more attached dwellings. See ANSI/AARST RMS-MF² *Radon Mitigation Standards for Multifamily Buildings* Section 9.3.5 when mitigation is intended for multiple dwellings in a shared building. When mitigation is not conducted in all attached dwellings in a shared building, see RMS-MF Section 12.3 *Statement of Client Obligations Regarding Inadvertent Collateral Mitigation*.

2.4.4 Design and warranties

This standard of practice is not intended to be used as a design manual, and compliance with its provisions will not guarantee reduction of indoor soil gas concentrations to any specific concentration.

2.4.5 Safety

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