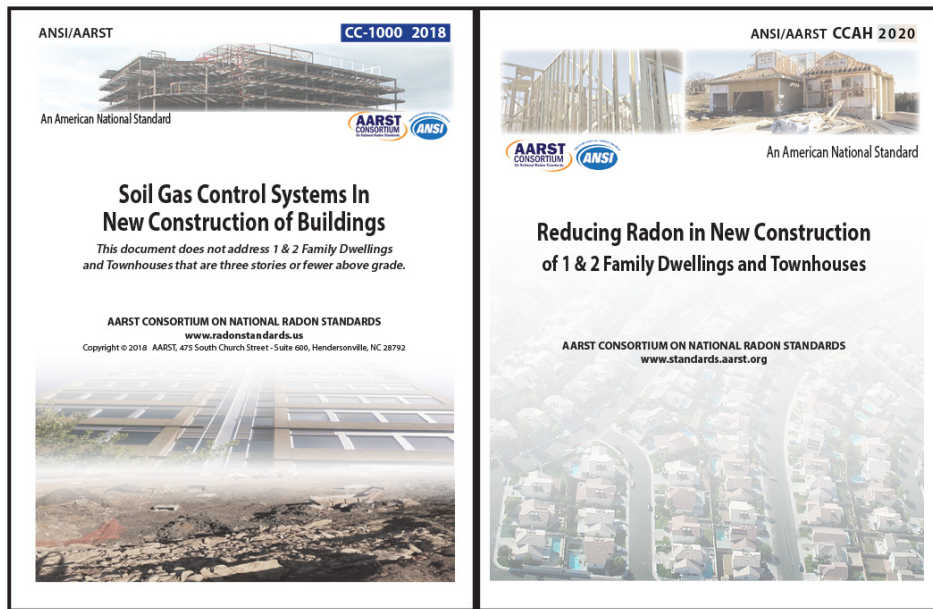


CC-1000 Updates 7/22

Continuous maintenance efforts to improve these standards are currently ongoing.



Read me

This work compilation contains another collection of proposed revisions that address administrative updates and harmonization with other ANSI/AARST standards. These proposed revisions to Sections 5 and 6 are relative to closure of between soil air and indoor air.

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.

A link to receive future public review notices and bylaw procedures for the AARST Consortium on National Radon Standards are available at www.standards.aarst.org/public-review.

Public Review: CC-1000 Updates 7-22

COMMENT DEADLINE: August 29th, 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: **CC-1000 Updates 7-22**

• **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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NOTE: AARST Consortium on National Radon Standards encourages original commentary on its standards. Commenters that choose to submit comments without an author's signature (due to difficulties in timeliness, proximity or other) shall be deemed to have done so at their sole discretion and have thereby acknowledged and accepted the copyright release herein. If commenters submit comments authored by others, those comments must also be accompanied by a signed copyright release from the author of the original comment. The original comment author and representing commenters may be asked to engage in dialog supporting their position.

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I hereby grant the AARST National Radon Standards Consortium the non-exclusive royalty rights, including non-exclusive royalty rights in copyright, in my proposals and I understand that I acquire no rights in publication of this standard in which my proposals in this or other similar analogous form is used. I hereby attest that I have the authority and am empowered to grant this copyright release.

Author's Signature: _____

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PLEASE 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."

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Commentary/Rational—The following content in Section 5.1 was recrafted to add clarity.

5.1 Close the bottom of the collection plenum(s)

The designed size of the soil gas collection plenum ~~gas permeable layer~~ shall be restricted to locations that adjoin the building foundation. Closure that resists air movement between the gas permeable layer and surrounding subgrade or fill is required;

- a) where highly permeable aggregates extend nominally 10 ft (3 m) below or horizontally away from the foundation;
- b) where the gas permeable layer would be open to sizable cavities, caves, crevices or outdoor air; and
- c) where soils adjoining foundations are known to pose acute, explosive or flammable soil gas hazards.

5.1.1 Closure specifications

Existing or constructed materials that surround *gas permeable layers* below and to the side shall be materials that, due to comparatively low permeability, impede the volumetric flow of soil gas into the *gas permeable layer*. Soils or aggregates containing more than 35% clay, silt, rock fragment fines and sand shall be acceptable for meeting this requirement. Where native or fill soils do not meeting this specification, other methods of closure, such as a soil gas retarder, shall be implemented. Soil gas retarders used for this purpose shall:

- a) comply with material specifications in Section 6.3.1; and
- b) be positioned to restrict air movement while not sealed to be impervious to groundwater migration into and out of the gas permeable layer.

Commentary/Rational—The following content in Section 5.2 was recrafted for clarity.

5.2 Close the sides of the plenum(s) before installing gas permeable materials

5.2.2 ~~Waterproofing~~ Dampproofing

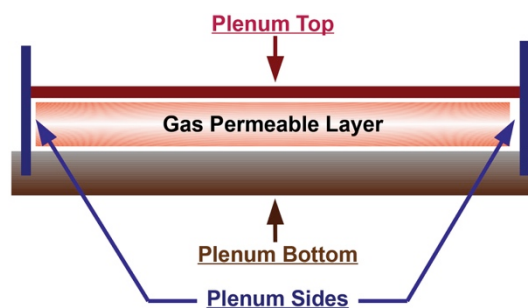
All foundation walls ~~and floors~~ in contact with the soil shall be damp proofed or waterproofed with methods consistent with Section 1805 of the International Building Code.¹ The methods shall be applied on exterior surfaces of walls from the top of the footing to above ground level, to include closure of all cold joint seams below grade.

Commentary/Rational—ALL of the following content in Section 6 was recrafted for clarity.

SECTION 6: CLOSE THE TOP OF THE PLENUM

Note—Any benefits anticipated for reducing soil gas entry with passive soil gas vent systems are negated if a continuous barrier is not established to resist air movement between soil and airspaces within a building.

Figure 6.1



¹ The International Building Code (IBC) 2015 (as published by the International Code Council).

6.1 General.

A continuous sealed barrier that resists air movement between soil and indoor air is required. The capacity for the closure of concrete floors and *soil gas retarders* to degrade over time shall be evaluated when choosing materials and methods for sealing the top of the *soil gas collection plenum(s)*, including for:

- a) degradation due to building settlement or movement;
- b) shrinking or cracking of building materials; and
- c) potential needs to access mechanical systems under floors.

6.2 Closure of concrete floors

6.2.1 Soil gas retarder

Soil gas retarder material shall completely cover all soil areas under each concrete floor and be placed between the gas permeable layer and the concrete slab. The soil gas retarder materials and installation shall comply with Section 6.3.

6.2.2 Above the soil gas retarder

6.2.3 Construction joints in interior concrete floors

Permanent closure shall be provided for all concrete joints around the perimeter of each slab and at all expansion or contraction joints. Closure shall be achieved by means of gasket materials made of closed cell polyethylene or equivalent products that retain closure of joints after concrete shrinkage. Caulk meeting ASTM C920 class 25 or higher shall be applied after concrete cures where needed to complete closure of these joints

Exception: Such caulk applied to joints shall be permitted as an equivalent method where applied 28 days or more after the slab is cast, unless a qualified concrete or structural professional has verified concrete mixtures allow a shorter curing period.

6.3 Soil Gas Retarder Materials and Installation

6.3.1 Soil gas retarder materials

Soil gas retarder materials placed below adjoining concrete slabs shall comply with specifications in a), b) or c) of this Section 6.3.1.

- a) Soil gas retarder membranes that are a minimum of 10-mil (0.010 inch; 0.254 mm) in thickness with products that conform to ASTM E1745;
- b) Products designed to form a permanent homogenous closure for chemical containments, such as spray-applied vapor barriers and geomembranes; or
- c) As required in Section 6.3.1.1.

6.3.1.1 Vapor Intrusion

Where the purpose of the system includes vapor intrusion from known chemicals of concern (COC), compliance with a) and b) of this Section 6.3.1.1 is required.

- a) An evaluation shall be made prior to installation to help ensure degradation of the soil gas retarder material will not occur over time due to exposure to chemicals known to be present.
- b) Based on manufacturer testing and documentation, soil gas retarder materials installed shall be capable of retaining permeance that inhibits diffusion of the chemicals of concern through the membrane, regardless of expected potential for membrane degradation over time.

6.3.2 Soil gas retarder installation

The soil gas retarder installation shall result in continuous closure that resists air movement between soil and indoor air:

- a) along all outer perimeters and edges of each *soil gas collection plenum*;
- b) at membrane seams; and
- c) at membrane penetrations.

Soil gas retarder membrane configurations shall be secured to withstand anticipated loads that might pull or tear the *soil gas retarder* membrane away from foundation walls or footings.

Exception: Monolithic/Post-tension Foundation. Where the floors and footings are monolithic, the *soil gas retarder* shall extend under the footings.

6.3.2.1 Mechanically Fastened

Soil gas retarder membranes shall be mechanically fastened and sealed, in accordance with Section 6.3.3, to foundation walls or footings and at structural supports. Mechanical fastening materials shall be rated for damp and wet conditions.

A termination bar or equivalent fastening method shall leave no outer edges of the membrane unsecured where:

- a) soil gas retarders are installed to close the top of soil not covered by concrete; and
- b) where lines of evidence suggest that vapors from *chemicals of concern (COC)* or other hazardous soil gases could pose a health concern to building occupants.

Exception 1: Where a membrane manufacturer system design secures the membrane to withstand anticipated loads that might pull or tear the *soil gas retarder* membrane away from foundation walls or footings.

Exception 2: Monolithic poured foundations.

6.3.3 Membrane edges, seams, penetrations and repairs

6.3.3.1 Edges and Seams (soil gas retarders)

All seams between adjacent membrane sheets and outer perimeters edges of the membrane shall be sealed or closed to resist air movement between soil air and indoor air, as required in a) and b) of this Section 6.3.3.1.

a) Perimeters Edges

Caulk meeting requirements of ASTM C920 class 25 or equivalent closure sealants or methods shall be applied to all outer membrane edges.

b) Seams

Seams between adjacent membrane sheets shall be overlapped not less than 6 inches (15 cm) and sealed by one of the following methods:

1. A tape recommended by the membrane manufacturer; or
2. Caulk compliant to ASTM C920 class 25 or greater; or
3. An equivalent method, such as heat welded or spray applied sealing of seams as an alternative to overlapped seams or a system that meets manufacturer design specifications.

6.3.3.2 Penetrations (soil gas retarders)

All openings around mechanical or structural penetrations of a *soil gas retarder* membrane shall be closed to resist air movement between soil air and air above the membrane. Gasket fittings, pipe clamps, sealants or other equivalent methods shall be employed to secure closure where *exhaust vent piping*, foundation supports, plumbing and other utilities penetrate the membrane.

6.3.3.3 Repairs (soil gas retarders)

Tears or punctures in the membrane shall be sealed by one or more of the following methods:

- a) A tape recommended by the membrane manufacturer; or

- b) An additional sheet of the membrane material that covers and overlaps the tear or puncture not less than nominally 6 inches (15 cm) on all sides and that is sealed with a caulk complying with ASTM C920 class 25 or greater; or
- c) An equivalent method.

6.3.4 Over exposed soil (soil gas retarder installation)

A soil gas retarder shall be installed to cover the top of all soil not covered by concrete, such as earthen crawl space floors, in a manner that conforms to all contours of the grading. The materials and installation shall comply with all other provisions of Section 6.3.

6.3.4.1 Anticipated Loads/Degradation

For membranes over exposed soil not covered by concrete, the membrane product shall be capable of withstanding anticipated loads and degradation as required in a) and b) of this Section 6.3.4.1.

- a) 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.
- b) 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 thicker materials, running mats or other protective materials are installed on top of the membrane, to include where trafficked; where heavy items are stored; or where exposed to sunlight. When choosing this option, the protective materials shall be:

- a) secured in place, such as by adhesives, and
- b) labeled for their purpose with guidance, such as "Do not discard. This component is to protect the soil gas retarder from damage which is a component of a soil gas mitigation system."