



# BOABC – Radon Provisions

February 22, 2024

Hosted by: Ken Kunka AScT, RBO

Promoting Building Safety and Professionalism



# Overview

Information presented today does not directly represent the opinions of the City of Penticton or the Building Officials Association of BC.

This presentation is conceptual and for informal educational purposes only. The presenters and association takes no responsibility for application of any concepts or interpretations in this presentation to specific projects.

(it may ask more questions than provide answers)

The slides must not be considered complete or exhaustive. Code provisions have been generally represented and may not reflect all exceptions.



# Rules of the Room



- Registration will be tracked
- Presentation is not recorded but PowerPoint will be posted
- Please use raise hand icon if you have a question or comment
- PUT IT in the CHAT
- Please mute your microphone
- You may need to turn off your camera
- Please follow up by email if you have specific question or example to share with the membership.
  - [kkunka@boabc.org](mailto:kkunka@boabc.org)



## Poll Question #1

What is your level of BOABC Certification?

- Level 01 Building – 20%
- Level 02 Building – 8%
- Level 03 Building – 34%
- Level 01 Plumbing – 25%
- Level 02 Plumbing – 11%
- Other – 1%



# Feb 22/24 – Radon Provisions

## Today

- BOABC What's New – Education
- Interpretations and Appeals
- Radon
  - 9.13.4 – Soil Gas
  - 9.25.3.6 – Air Barrier
  - Basics for plan reviews & site inspections

### Lunch and Learns

CPD Eligibility: 1 point/presentation (Category A4). You will need to self report this point. Initial next to the presentation and then save it as a pdf to upload as proof. Previous Lunch and Learns can be found:

<https://boabc.org/cpd-opportunity-lunch-learn-webinars/>



# What's New at the Association

## What's New

Cooling Requirements

Lunch & Learn –  
February 22, 2024



[Learn More ▶](#)

CPD Opportunity –  
Workshop: High  
Performance Building  
Envelopes and Step  
Code for Part 9 Homes



[Learn More ▶](#)

CPD Opportunity –  
Modular Housing  
Summit 2024



[Learn More ▶](#)

CPD Opportunity –  
F280 Software  
Verification Results



[Learn More ▶](#)



# 2024 NEW Code - Code Updates

If you attended the in-person training at the River Rock in November, **you are not** required to register for the online code update courses.

## 2024 Building & Plumbing Code Update Courses



[Learn More](#)

### Training requirements for qualified officials:

- Building: qualified building officials must complete the building code update training only
- Plumbing: qualified plumbing officials must complete the plumbing code update training only
- Building & Plumbing: anyone who is dual qualified as both a building and plumbing official must complete building **and** plumbing code update training

Building (includes Energy) & Plumbing - <b>Pre-register</b>	\$375 plus GST
Building Only (includes Energy) - <b>Pre-register</b>	\$325 plus GST
Plumbing Only - <b>Register now</b>	\$125 plus GST
Energy Only - <b>Register now</b>	\$125 plus GST

Get the word out – Open to non-members





# BOABC 2024 Conference

2024 BOABC  
Conference  
Registration is Now  
Open



[Learn More ▶](#)

## 2024 Conference



The 2024 Conference for the Association will be taking place May 26 to 29, 2024 at the River Rock Casino Resort.

[www.boabc.org](http://www.boabc.org)

May 26 to 29





# BOABC 2024 AGM



Calendar

Online Learning Information

[About](#) [Membership](#) [Qualification](#) [Certification](#) [Exams](#) [Education & Interpretations](#) [2024 Conference](#) [Contact Us](#)



[Home](#) / [News](#) / [Call for Nominations - BOABC 2024 AGM](#)

## Call for Nominations – BOABC 2024 AGM

The BOABC Annual General Meeting, will be held at 9:00 am on Tuesday, June 25, 2024. Unlike past years, the AGM is not being held at the Annual Conference in May. Instead, the AGM will be held online.

Pursuant to section 7(4) of the [bylaws](#), formal notice of the AGM will be distributed to all members at least 30 days before the June 25, 2024, meeting date. The notice will include a registration link for the online meeting and agenda documents for members to review ahead of time.

The Governance and Nominating Committee is calling for nominations of candidates to serve on the BOABC Executive Committee.

- [Positions Open for Nomination](#)
- [Call for Nominations Form](#)

If you have any motions to put forward, please complete the [Call for Motions form](#).

Completed and signed nomination and motion forms must be submitted by 3:00 pm on Friday, April 12, 2024, to be considered at the 2024 AGM.

Call for Nominations –  
BOABC 2024 AGM



[Learn More](#)

[www.boabc.org](http://www.boabc.org)

AGM – June 25th



# 2024 NEW Code – Revisions List

## 2024 Code Update Handouts of Changes

You may find the **Handouts of Changes** for the 2024 Building & Plumbing Codes below. Please click on each link to open and view the changes.

- [Preface, Div. A, Div. B](#)
- [Part 3](#)
- [Part 4](#)
- [Part 5](#)
- [Part 6](#)
- [Part 9 – Accessibility](#)
- [Part 9 – Fire Protection](#)
- [Part 9 – Earthquake & Windloads](#)
- [Part 9 – Radon](#)
- [Part 9 – Footings & Foundations](#)
- [Part 9 – Heat Transfer](#)
- [Part 9 – Roofing & Cladding](#)
- [Part 9 – Interior Finishes](#)
- [Part 9 – Overheating](#)
- [Part 9 – Energy](#)
- [Part 10 – Energy](#)
- [Plumbing](#)

### WHAT'S NEW



01.12.2024

#### CPD Opportunity – Enhancing Mechanical Contractors' Impact in Building Commissioning and Re-Commissioning

MCABC is pleased to present a workshop focused on empowering Mechanical Contractors in Building Commissioning...



01.4.2024

#### CPD Opportunity – Gentle Density Leaders Summit

With the Bill 48 legislation enabling small scale multi-unit housing types in residential areas across the...



01.4.2024

#### Student Awards

It is that time of year again where we are accepting Student Award applications. The...



01.2.2024

#### Public Review Open: Mass Timber Construction Code Proposals

The provincially led national Joint Task Group – Harmonized Variations for Mass Timber (JTC-HVMT) is...



#### New Architects Regulation Information

The Architectural Institute of BC (AIBC) has developed a Descriptive Information



## Poll Question #2

Is your department using/requiring the Energy Step Code Compliance Forms that were released by the Province the fall of 2023?

- Yes – 72%
- No – 8%
- Not sure – 20%



# 2023 BC Code Interpretations

## Building and Plumbing Code Interpretations 2018

Search:

Code Edition	Interpretation Number	Title	Date Approved	File
NEW 2018	18-0298	Barrier to Vapour Diffusion	16/01/2024	<a href="#">Download</a>
NEW 2018	18-0296	Window Between the Attached Garage and Dwelling Unit	16/01/2024	<a href="#">Download</a>
NEW 2018	18-0295	Roof-top Service Room for Townhouse Unit	16/01/2024	<a href="#">Download</a>
NEW 2018	18-0293	Foundation Walls above Finished Ground Level	16/01/2024	<a href="#">Download</a>
2018	18-0292	Sprinklers in Refuse Storage Rooms in a Part 9 Building	21/11/2023	<a href="#">Download</a>
2018	18-0291	Door Frame Installation to Wall, for Doors in Fire Separations	21/11/2023	<a href="#">Download</a>
NEW 2018	18-0290	Location of Drainage Pipe for an Exterior Foundation Wall	16/01/2024	<a href="#">Download</a>



# Next Lunch and Learn – March 21

## Professional Practice & Consistency – new Code

- **Part 3**
- **Part 9**

Please forward questions, bulletins or plan review checklists to Ken Kunka at [kkunka@boabc.org](mailto:kkunka@boabc.org) OR Forum Chat.





# Radon Provisions

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- Dangers of Radon
- Code Background & Local Government Guide comparison
- 9.13.4.3. Rough-in for a Subfloor Depressurization System
- 9.25.3.6. Air Barrier Systems in Floors-on-ground
- Basic requirements for Plan reviews and Site Inspections

Please forward questions, bulletins or plan review checklists to Ken Kunka at [kkunka@boabc.org](mailto:kkunka@boabc.org) OR Forum Chat





## Poll Question - 3

Does your Local Government currently require Rough-In for soil depressurization systems?  
(9.13.4.1.)

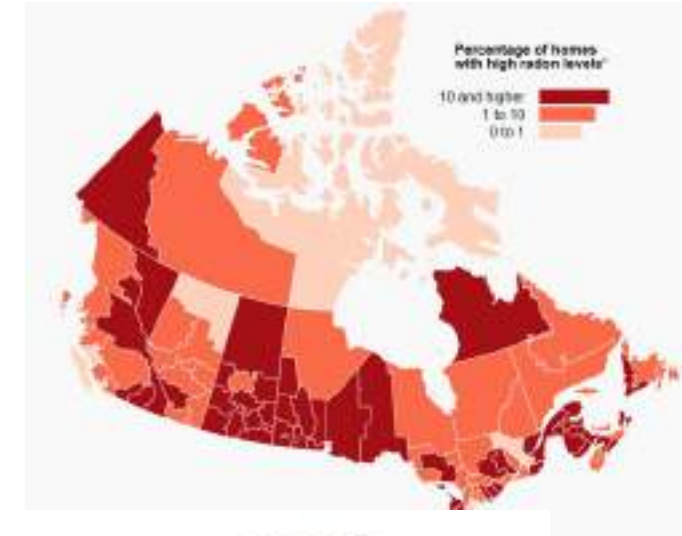
- Yes – 37%
- No – 63%



# Radon Background

Radon is a colourless, odorless, radioactive gas that occurs naturally because of the decay of uranium. It is found to varying degrees as a component of soil gas in all regions of Canada.

When radon mixes with the air outside, it's not a problem: the air outside dilutes the amount of radon. But when radon seeps into a closed-in space like a house, it can be harmful. Radon decays quickly, giving off tiny radioactive particles, which can become trapped inside. You and your family can breathe in high levels of radon without knowing it. When inhaled, these radioactive particles can damage the cells that line the lung. **Long-term exposure to radon has been proven to lead to lung cancer.**





# Radon Information

## Organizations outlining Radon dangers and mitigation



<https://bclung.ca/radon>



Canadian Association of Radon Scientists and Technologists

Helping Canadians Reduce Radon Risk

<https://www.carst.ca/>



<https://www.healthlinkbc.ca/healthlinkbc-files/radon-homes-and-other-dwellings>



Government  
of Canada

Gouvernement  
du Canada

<https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/radon.html>

B R E A T H E  
the lung association

<https://www.lung.ca/radon>



## Radon Action Guides – 100 Radon Test Kit Campaign

### Contact:

Lydia Chui, MPharm

(she | elle)

A/ Regional Radiation Specialist,  
Environmental Health Program

Regulatory Operations and  
Enforcement Branch

Health Canada / Government of  
Canada

Lydia.Chui@hc-sc.gc.ca | Tel: 604-  
666-3351

# Radon Awareness

TAKE ACTION ON RADON

Test ▾ Protect ▾ Learn ▾ Resources ▾ GET STARTED

100 Radon Test Kit Challenge

Are you a 100 Radon Test kit Challenge Participant this year?

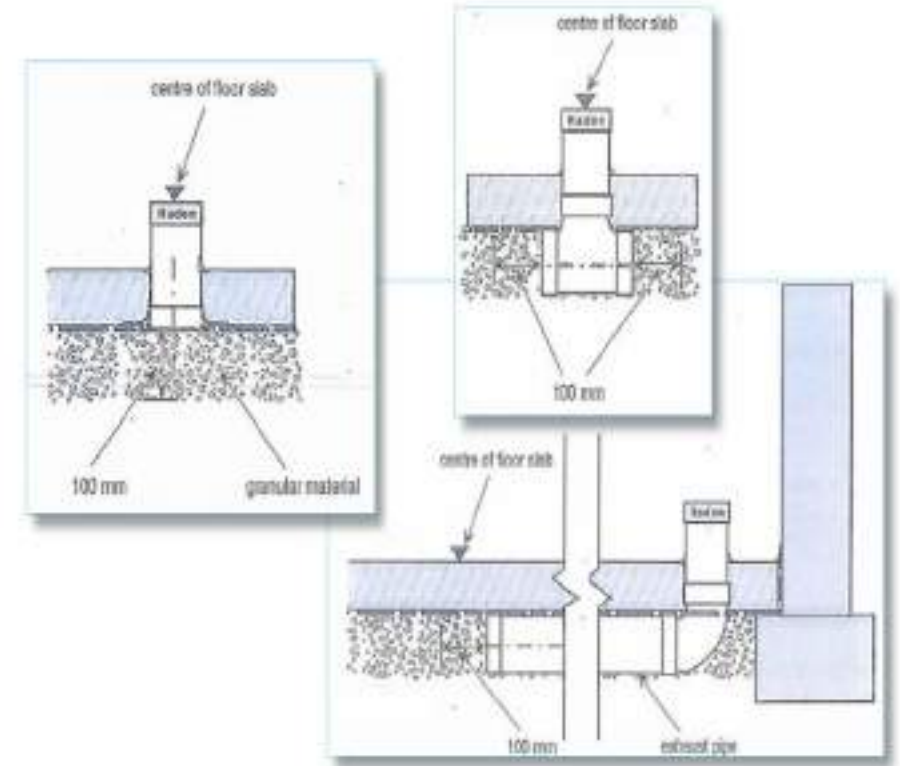
We are challenging municipalities across Canada to take part in the 100 Radon Test Kit Challenge.

<https://takeactiononradon.ca/resources/100-radon-test-kit-challenge/>



# Radon Background (2012)

Radon provisions were first introduced within the 2012 BC Building Code and mandated radon-ready rough-in installation for preparation of subfloor depressurization system between air barrier and the ground for all residential occupancy.



2012 BCBC – capped pipe





# Radon Background (2014)

Radon provisions were updated in **2014 - No. B14-07** to require a soil depressurization system for selected regions of BC and introduced exempted regions.

Table C-3, “Locations in British Columbia Requiring Radon Rough-Ins,” in the BC Building Code classifies locations demonstrated to have an elevated risk of the presence of indoor radon levels which exceed  $200 \text{ Bq/m}^3$  as Radon Area.



Figure 2



Information Bulletin  
Building and Safety Standards Branch  
PO Box 8844 Stn Prov Govt  
Victoria BC V8W 9T2  
Email: [building\\_safety@gov.bc.ca](mailto:building_safety@gov.bc.ca)  
Website: [www.housing.gov.bc.ca/building](http://www.housing.gov.bc.ca/building)

No. B14-07  
September 19, 2014

## New Radon Rough-in Requirements

On December 19, 2014, new requirements for protection from soil gases become effective. BC Building Code provisions for the rough-in for a subfloor depressurization system now require installation of a radon vent pipe which extends through, and terminates outside, the building.

The new requirements provide a more adaptable substructure for future radon mitigation and require the designer to account for routing of the radon vent pipe during the design stage. This change applies to Part 9 dwelling units and buildings containing residential occupancies where floor assemblies separate conditioned space from the ground. There are no changes to building exemptions based on location and building occupancy.<sup>1</sup>

The potential for high levels of radon infiltration can be challenging to evaluate prior to construction and a radon problem may only become apparent once the building is completed and occupied. Radon mitigation systems are proven to reduce the likelihood of adverse health effects from radon, such as lung cancer. There are links provided in Appendix A of the BC Building Code for information on testing for radon in your home and guidelines for when mitigation is recommended. Those links, as well as sources for more information on radon, are included in the Appendix to this bulletin. It is the owner's responsibility to test their home, and it is recommended that the home be tested again after installation of a radon mitigation system.

The most common and efficient radon mitigation method is soil depressurization. A soil depressurization system requires:

- space for the movement of soil gases between the ground and the air barrier system (see the gas permeable layer in Figure 1) into which a radon vent pipe is inserted;
- the radon vent pipe then extends to the exterior of the building and terminates in a safe location (as shown in Figure 1); and
- the radon vent pipe to be mechanically assisted, typically by means of a fan installed along the pipe, to create a negative pressure in the space between the air barrier system and the ground and exhaust soil gases outside the building.

The BC Building Code does not require installation of a fan during initial construction, although designers should consider the future installation of a fan (which will require access and electrical supply) somewhere along the radon vent pipe.

The BC Building Code refers to material that creates the space allowing the movement of soil gases between the air barrier system and the ground as a gas permeable layer<sup>2</sup> (see Figure 1). The gas permeable layer allows for effective depressurization of that space, and functions as the drainage layer required in Article 9.16.2.1. A typical solution is to install coarse clean granular material below the floor on the ground. This allows compliance with 9.16.2.1.(1)

<sup>1</sup> Exceptions are listed in Article 9.13.4.2. and Table C-3 in Appendix C of the BC Building Code.

<sup>2</sup> The gas permeable layer described in Clause 9.13.4.3.(3)(a) consists of not less than 100 mm of clean granular material containing not more than 10 % of material that will pass a 4 mm sieve.





# Radon Background (2014)

The most common and efficient radon mitigation method is soil depressurization. A soil depressurization system requires:

- space for the movement of soil gases between the ground and the air barrier system (see the gas permeable layer in Figure 1) into which a radon vent pipe is inserted;
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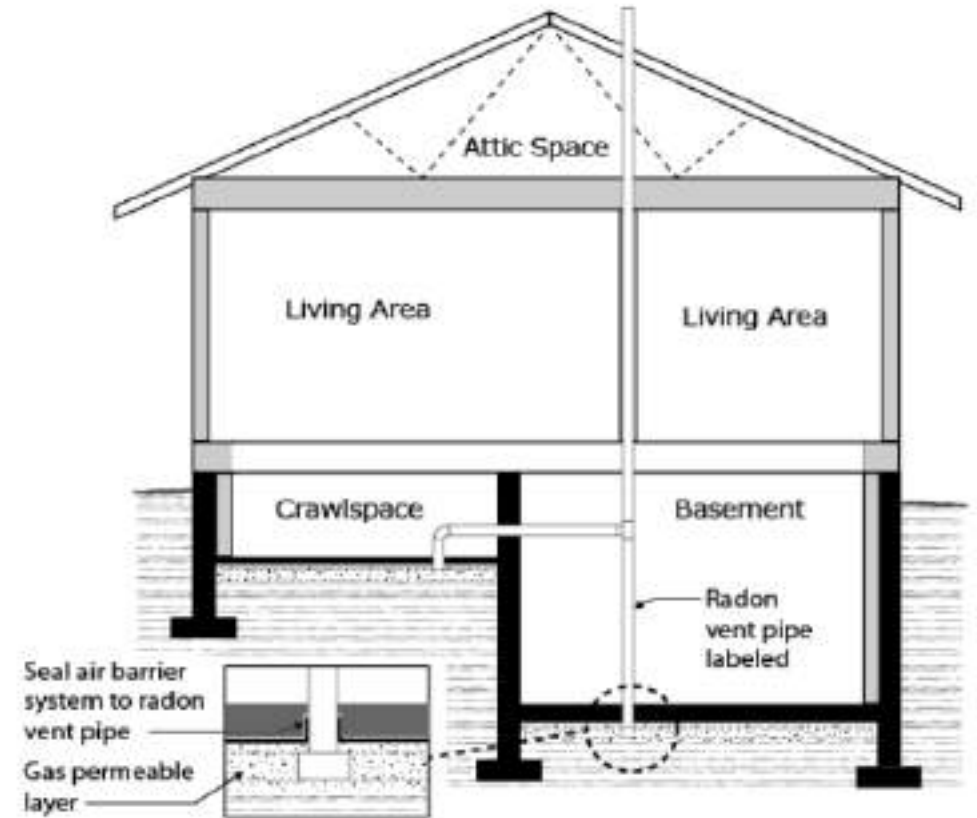


Figure 1



# Radon – Code Guide Examples

There is very little information available online related to BC Code requirements for radon installations.

The City of Penticton will be updating its existing Radon Bulletin and will make available to other jurisdictions for use.

**City of Penticton Building Bulletin**  
 Feb. 22, 2024 | Bulletin No. 2123 | RADON

### RADON CONTROL FOR PART 9 BUILDINGS

Plan and site installation requirements for under slab radon control (UBRCRC)

**Purpose**  
 The purpose of this bulletin is to provide a consistent interpretation of the installation of radon control systems and rough-in for under slab depressurization as outlined in the 2024 BC Building Code (BCBC). The following information will provide clarification for typical installation standards to ensure minimum Building Code standards are achieved for the under slab radon barrier and rough-in subfloor depressurization system for all buildings intended to be occupied on average for greater than 4 hours within a 24-hour period (residential and Non-Residential).

**Position and the surrounding areas** have been identified as areas prone to high levels of radon. This area is identified as Radon Area 1 within the BCBC.

**Background and References**  
 What is Radon?  
 Radon is a colorless, odorless, radioactive gas that occurs naturally as a result of the decay of radium. It is found in varying degrees as a component of soil gas in all regions of Canada and is known to enter dwelling units by infiltration into basements and crawl spaces. The presence of radon in sufficient quantity can lead to an increased risk of lung cancer.

Outdoor air entering a dwelling through above-grade leaks in the building envelope normally improves the indoor air quality in the dwelling by reducing the concentrations of pollutants and water vapour. It is only undesirable because it cannot be controlled. On the other hand, air entering a dwelling through below-grade leaks in the envelope may increase the water vapour content of the indoor air and may also bring in a number of pollutants picked up from the soil. This mixture of air, water vapour and pollutants is sometimes referred to as "soil gas." One pollutant often found in soil gas is radon.

**BC Building Code – Part 9:**  
 9.13.8. Soil Gas Control  
 9.13.8.2. Rough-in for a Subfloor Depressurization System  
 9.25.3.5. Air Barrier Systems in Floors on-ground  
 9.26.2.8. Thermal Characteristics of Building Assemblies Below-Ground or in Contact with the Ground

**CAN/CSA 18811 – Sections 7.3.3, 7.2.4.6 and 7.3.4** (approved for Code compliance)  
[CAN/CSA 18811 – Section 7.3.3, 7.2.4.6 and 7.3.4](#) (approved for Code compliance)

[CAN/CSA 18811 – Section 7.3.3, 7.2.4.6 and 7.3.4](#) (approved for Code compliance)

**Attachment 1**  
**9.13.8.4. Soil Gas Control**  
 Acceptable details to complete radon requirements using 60 mil poly membrane (Refer to 9.26.2.8 for installation requirements)

**CONCRETE SLAB AT GRADE**

**BASEMENT FOUNDATION WITH FINISHED WALL ABOVE GRADE**

**INTERIOR FOUNDATION AND PENETRATIONS**

**SLAB DETAILS**

Note that an alternative for the 100mm (4") granular material has been registered through the Canadian Concrete Pavement Institute (CCPI).

Please refer to product registration and installation requirements - Radon Guard (Installation & 120014) manufactured by Fox Architecture – Under-Slab DPS based with channels for ventilation



## Poll Question # 4

Is your Local Government currently updating or creating a guide for Radon provisions - soil depressurization systems (9.13.4)

- Yes – 24%
- No – 76%



# Radon 2024 Code Changes

- Editorial and new information for installation requirements in
  - 9.13.4.1. Application and Scope
  - 9.13.4.2. Protection from Soil Gas Ingress
  - 9.13.4.3. Rough-in for a Subfloor Depressurization System
- The changes also update the technical provisions for radon rough-in design and installation
- **Major reason for changes are to align with the NBC**
- **Blue font** = Code changes\*

## Major Change from 2018 BCBC

### 9.13.4.2.

#### **Removal of references to:**

- 2) Dwelling units and residential occupancies
- 3) Occupied buildings - 4 hours within a 24-hour period.
- 4) Article 1.1.3.3. of Division B – Table C-4 exemptions
- 5) Reference to 9.16.2.1.(2)(b)

### 9.13.4.3.

- Most prescriptive measures removed or altered.
- **Reference to CAN/CGSB 149.11**

**\*local jurisdictions that have been requiring depressurization systems should re-establish protocols!**



# Radon 2024 Code Changes

## 9.13.4.2(4)

Previously, British Columbia data suggested that there were areas of the province with low probability to experience elevated indoor radon levels. Based on this information, certain areas of the province only required a soil gas barrier to protect homes but did not have to provide a rough-in for a subfloor depressurization system.

Additional research has shown that all areas of BC can be susceptible to radon and this proposed change eliminates the exemption in certain areas in British Columbia from the requirement of a radon rough-in for a subfloor depressurization system. Reference to **Table C-4 in Appendix C of Division B is discontinued.**

**This change particularly impacts locations that were previously exempt from installing a radon rough-in for a subfloor depressurization system. Changes to the specific requirements for the radon rough-in will help provide clarity on appropriate materials and methods.**



Image provided by RadonCorp  
<https://radoncorp.com/>



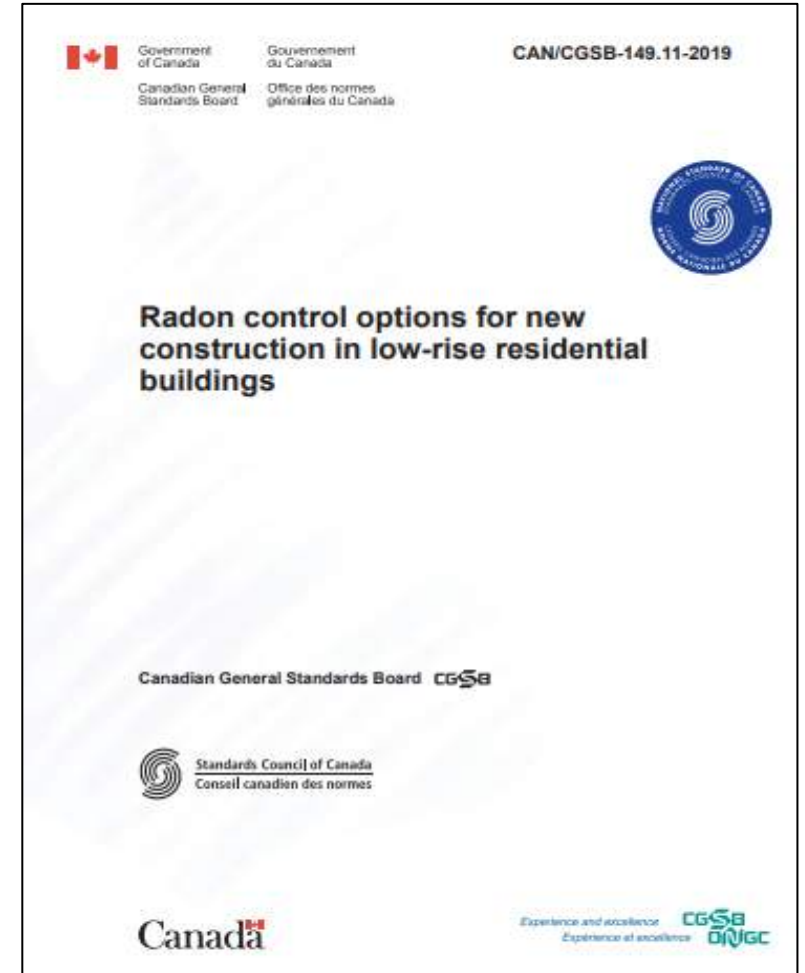


# Radon 2024 Code Changes

9.13.4.3 - Introduction of **CAN/CGSB-149.11**, “**Radon control options for new construction in low-rise residential buildings**,” standard is referenced to provide further explanation for installation of the radon rough-in and the system it is intended to support.

**CAN/CGSB-149.11 can be accessed for free online**

[https://publications.gc.ca/collections/collection\\_2019/ongc-cgsb/P29-149-011-2019-eng.pdf](https://publications.gc.ca/collections/collection_2019/ongc-cgsb/P29-149-011-2019-eng.pdf)







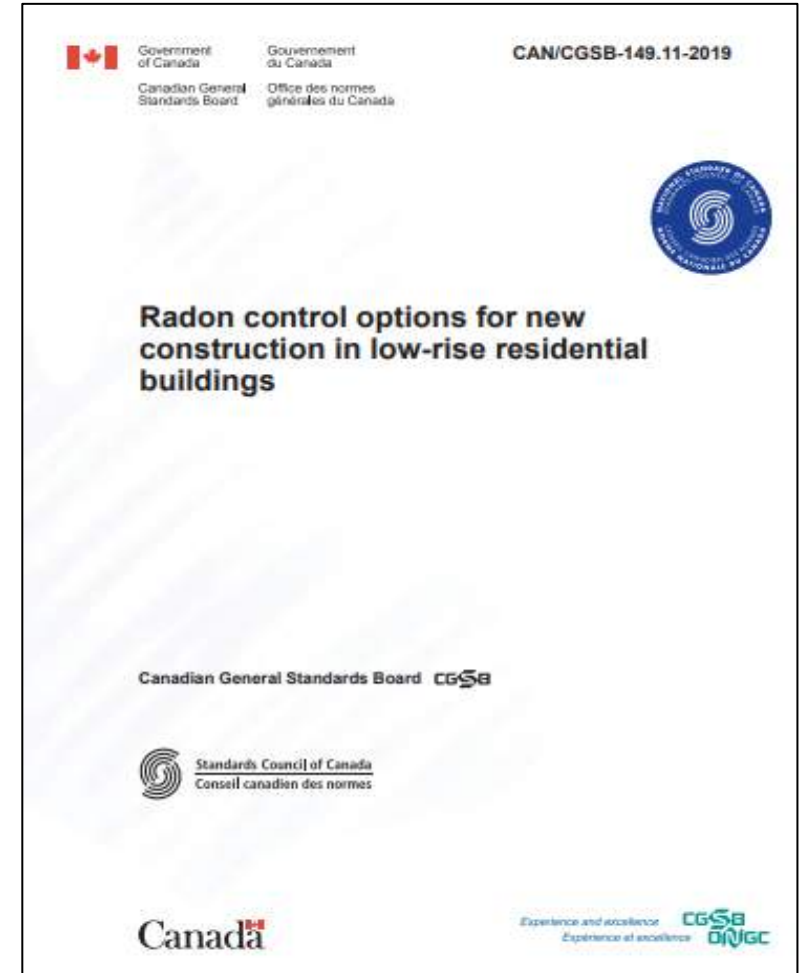
# Radon 2024 Code Changes

## Caution

Please note that **CAN/CGSB-149.11** references in the 2024 Code only refer to:

- 7.1.3 – Pipe and fittings
- 7.2.4.6 & 7.3.4– Exterior pipe terminations

**NOTE:** The Code is only for the installation of a **“rough-in”** depressurization system – not a Passive or Active system as referenced in the standard. Post Occupancy owners can test and install an Active System.





# 2024 BCBC – 9.13.4.1

## 9.13.4. Soil Gas Control

(See Note A-9.13.4.)

### 9.13.4.1. Application and Scope

1) This Subsection applies to

a) a *conditioned space* that has a wall, roof or floor assembly, or part thereof, that is in contact with the ground, and

b) the protection of the *conditioned space* described in Clause (a).

2) This Subsection addresses the leakage of *soil* gas from the ground into the building

***conditioned space*** means any space within a building the temperature of which is controlled to limit variation in response to the exterior ambient temperature by the provision, either directly or indirectly, of heating or cooling over **substantial portions of the year**.

- Garages – ?

**“ground”** is not a defined term

***soil*** means that portion of the earth’s crust that is fragmentary, or such that some individual particles of a dried sample may be readily separated by agitation in water; it includes boulders, cobbles, gravel, sand, silt, clay and organic matter



# 2024 BCBC – Conditioned Space

## 9.33.3. Design Temperatures

### 9.33.3.1. Indoor Design Temperatures

1) At the outside winter design temperature, required heating facilities shall be capable of maintaining an indoor air temperature of not less than

- a) 22°C in all living spaces,
- b) 18°C in unfinished *basements*,
- c) 18°C in common *service rooms*, ancillary spaces and *exits* in houses with a *secondary suite*,  
and
- d) 15°C in heated crawl spaces.

2) At the outside summer design temperature, required cooling facilities shall be capable of maintaining an indoor air temperature of not more than 26°C in at least one living space in each *dwelling unit*.

***conditioned space*** means any space within a building the temperature of which is controlled to limit variation in response to the exterior ambient temperature by the provision, either directly or indirectly, of **heating or cooling** over **substantial portions of the year**.

- Garages – No controlled temperature – not conditioned space?
- A dwelling over a garage – carriage home. The garage would not need to meet Radon provisions.



## Poll Question - 5

Do you agree that an enclosed garage would not be considered conditioned space (does not require radon provisions) – with or without living space above – like a carriage house?

- Yes – 65%
- No – 24%
- Not sure – 10%



# 2024 BCBC – 9.13.4.2

## 9.13.4.2. – Protection from Soil Gas Ingress

- 1) All wall, roof and floor assemblies, **or parts thereof**, separating **conditioned space** from the ground shall be protected by an **air barrier system** conforming to Subsection 9.25.3.
- 2) Unless the space between the **air barrier system** and the ground is designed to be accessible for the **future installation** of a subfloor depressurization system, buildings shall
  - a) be provided with the rough-in for a **subfloor depressurization system** conforming to Article 9.13.4.3., or
  - b) conform to Parts 5 and 6 for the protection from radon ingress and the means to address high radon concentrations in the future (see Articles 5.4.1.1. and 6.2.1.1.).

*Parts thereof* – new additions or buildings with mixed uses?

**Air barrier system** - means the assembly installed to provide a continuous barrier to the movement of air.

9.25.3 – Air Barrier Systems

**Future installation** – Unfinished crawl space or commercial unit?

9.13.4.3. – Rough-in for a Subfloor Depressurization System

Part 5 – Environmental Separation

Part 6 – Heating, Venting and Air Conditioning

5.4.1.1. - Required Resistance to Air Leakage (See Note A-5.4.1.1.)

6.2.1.1. - Good Engineering Practice





# 2024 BCBC – 9.13.4.3(1)

## Article 9.13.4.3. – Rough-in for a Subfloor Depressurization

- 1) Floors-on-ground shall accommodate the future installation of a subfloor depressurization system by installing a radon vent pipe, and a contiguous gas permeable layer between the air barrier system and the ground consisting of
  - a) a material or materials that allow effective depressurization of that space (see Sentence 9.16.2.1.(1)), or
  - b) not less than 100 mm of coarse clean granular material containing not more than 10% of material that would pass a 4 mm sieve. (1/8")

### 9.16.2.1. Required Installation of Granular Material

1) Except as provided in Sentence (2), not less than 100 mm of coarse clean granular material containing not more than 10% of material that will pass a 4 mm sieve shall be placed beneath floors-on-ground. (See Note A-9.16.2.1.(1) and see also Subsection 9.13.4. and Note A-9.13.4.)

“5/8 minus”



“radon rock”



If it appears to be packed (plate tamped), then it's the wrong granular material



# 2024 BCBC – Alternate materials

## Article 9.13.4.3. – Rough-in for a Subfloor Depressurization

1) (a) a material or materials that allow effective depressurization of that space (see Sentence 9.16.2.1.(1)), or

Approved alternative for granular layer.



Radon Guard – CCMC-13698


### [CCMC 13698-R] CCMC Canadian code compliance evaluation

From: [National Research Council Canada](#)

**CCMC** Canadian code compliance evaluation



CCMC number:	13698-R
Status:	Active
Issue date:	2014-06-13
Modified date:	2023-02-24
Evaluation holder:	► Terra Vent Systems Inc.
Product name:	Radon Guard™
Compliance:	NBC 2015
Criteria:	CCMC-TG-312113.15-15 "CCMC Technical Guide for Underslab EPS board with channels for radon ventilation"

 In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.

[Learn more about CCMC recognition](#) [Look for the trusted CCMC mark on products to verify compliance.](#)

<https://nrc.canada.ca/en/certifications-evaluations-standards/canadian-construction-materials-centre/ccmc-publications/document.html?type=cert&id=13698-R>



# 2024 BCBC – 9.13.4.3.(2)

## Sentence 9.13.4.3.(2) - restructured

- 2) The radon vent pipe required by Sentence(1) shall
  - a) be sealed to maintain the integrity of the air barrier system, with no perforations along the pipe above the air barrier system,”
  - b) have one or more inlets that allow for the effective depressurization of the gas-permeable layer (See Note A-9.13.4.3.(2)(b) and (3)(b)), and
  - c) permit connection to depressurization equipment,
  - d) where it passes through conditioned space, be completely surrounded by conditioned space,
  - e) consist of pipe and fittings in accordance with 7.1.3 of CAN/CGSB149.11, “Radon control options for new construction in low-rise residential buildings,”
  - f) terminate outside the building in a manner that does not constitute a hazard,
  - g) be installed to prevent the accumulation of moisture and away from locations where snow and ice accumulate, and
  - h) be clearly labeled every 1.8 m and at every change in direction to indicate that it is intended only for the future removal of radon from below the floor-on-ground.

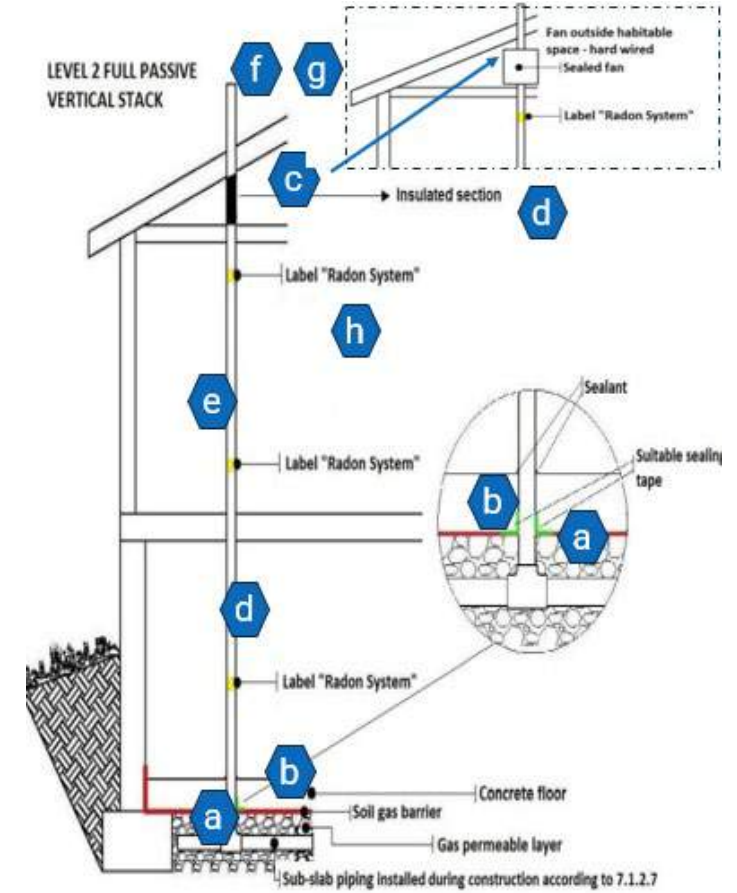


Figure 7.2b — Level 2 — Full passive vertical radon stack

Diagram from CAN/CGSB-149.11





# 2024 BCBC - Soil Gas Control

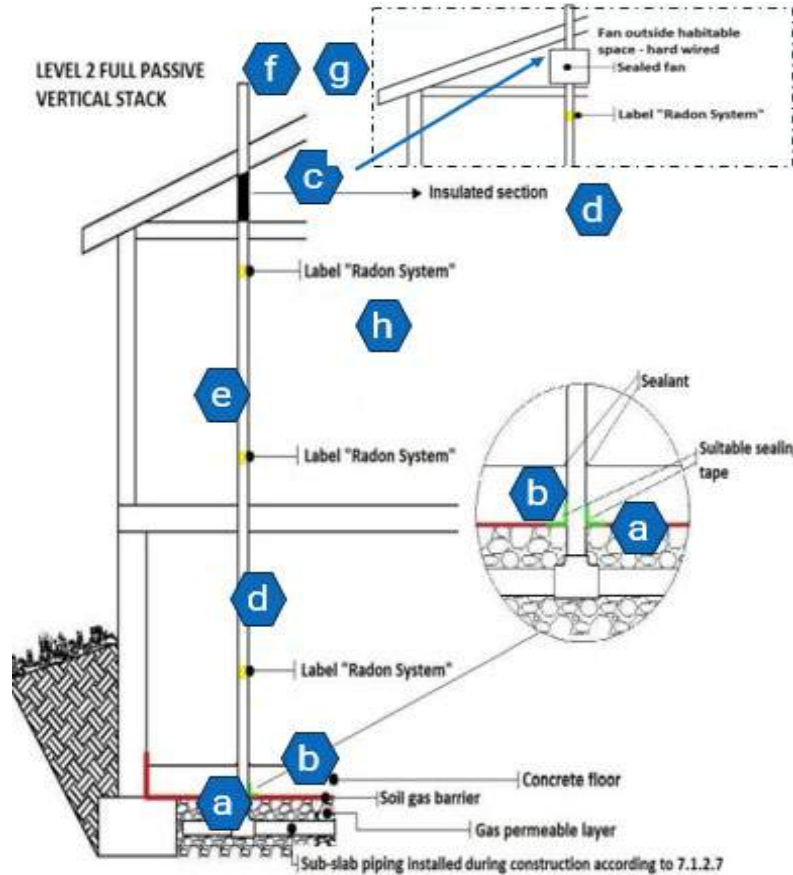


Figure 7.2b — Level 2 — Full passive vertical radon stack

Diagram from CANCAN/CGSB-149.11

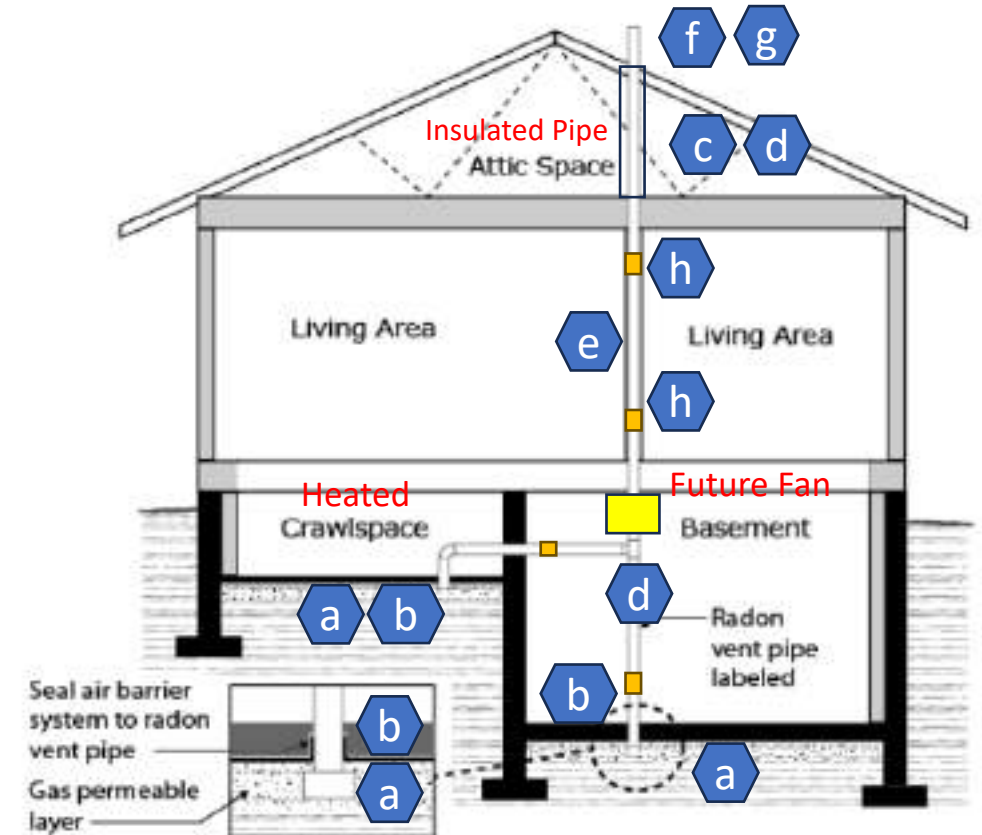


Figure 1



# 2024 BCBC – 9.13.4.3.(2)

CAN/CGSB-149.11-2019

## Sentence 9.13.4.3.(2)

- a) be sealed to maintain the integrity of the air barrier system, with no perforations along the pipe above the air barrier system,”

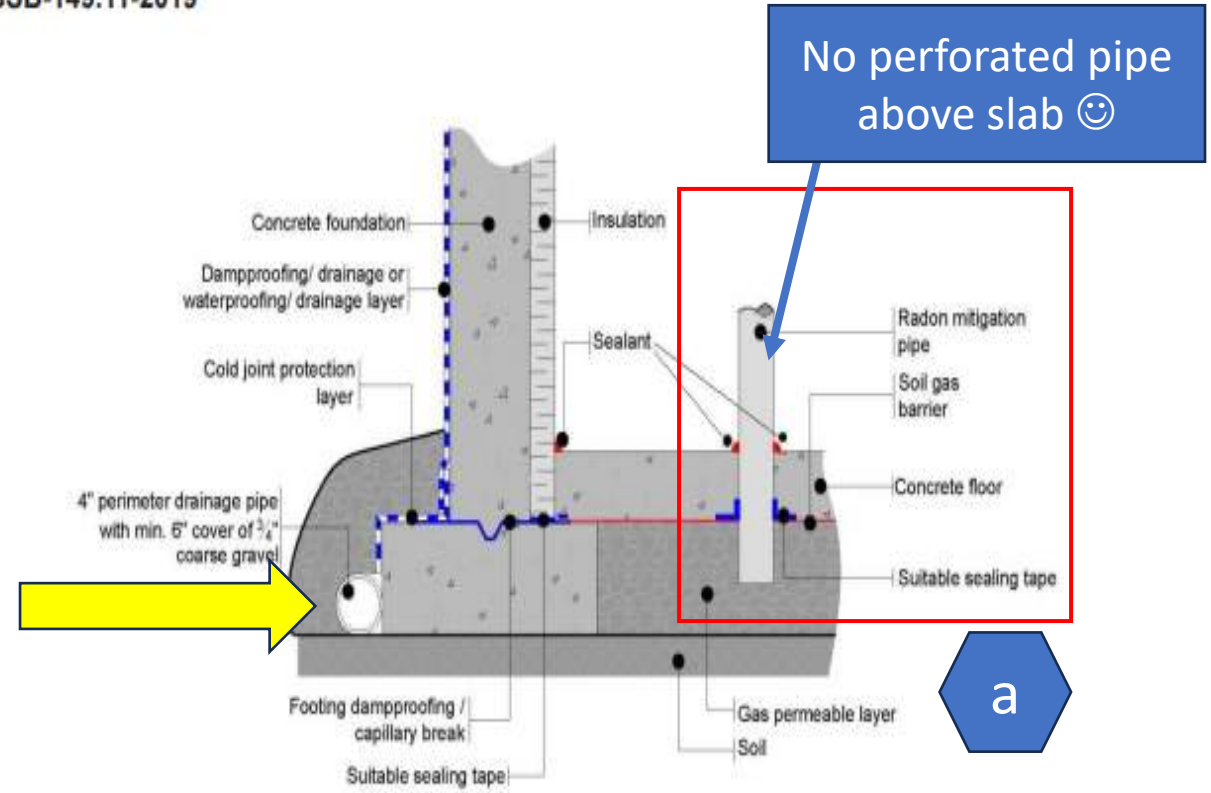


Figure 7.1.4.5.7 — Sealing sub-slab membrane horizontally to concrete footing when insulation is between the foundation wall and floor slab

**Member Question – Are there possible issues with the location of the perimeter draintile elevation and granular layer/pipe?**





# 2024 BCBC – 9.13.4.3.(2)

## Sentence 9.13.4.3.(2)

- a) be sealed to maintain the integrity of the air barrier system, with no perforations along the pipe above the air barrier system,”
- b) have one or more inlets that allow for the effective depressurization of the gas-permeable layer (See Note A-9.13.4.3.(2)(b) and (3)(b)), and

.....The arrangement and location of the extraction system inlet(s) may have design implications where the footing layout separates part of the space underneath the floor. If an area is segregated by a footing (for example), a through-footing pipe can join the area so that a single suction point can depressurize both areas. However, for large buildings, it may be preferable to have multiple suction points.

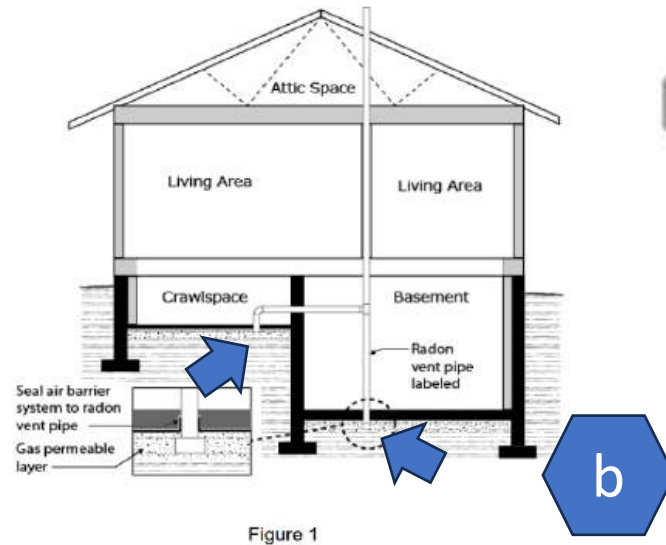


Figure 1

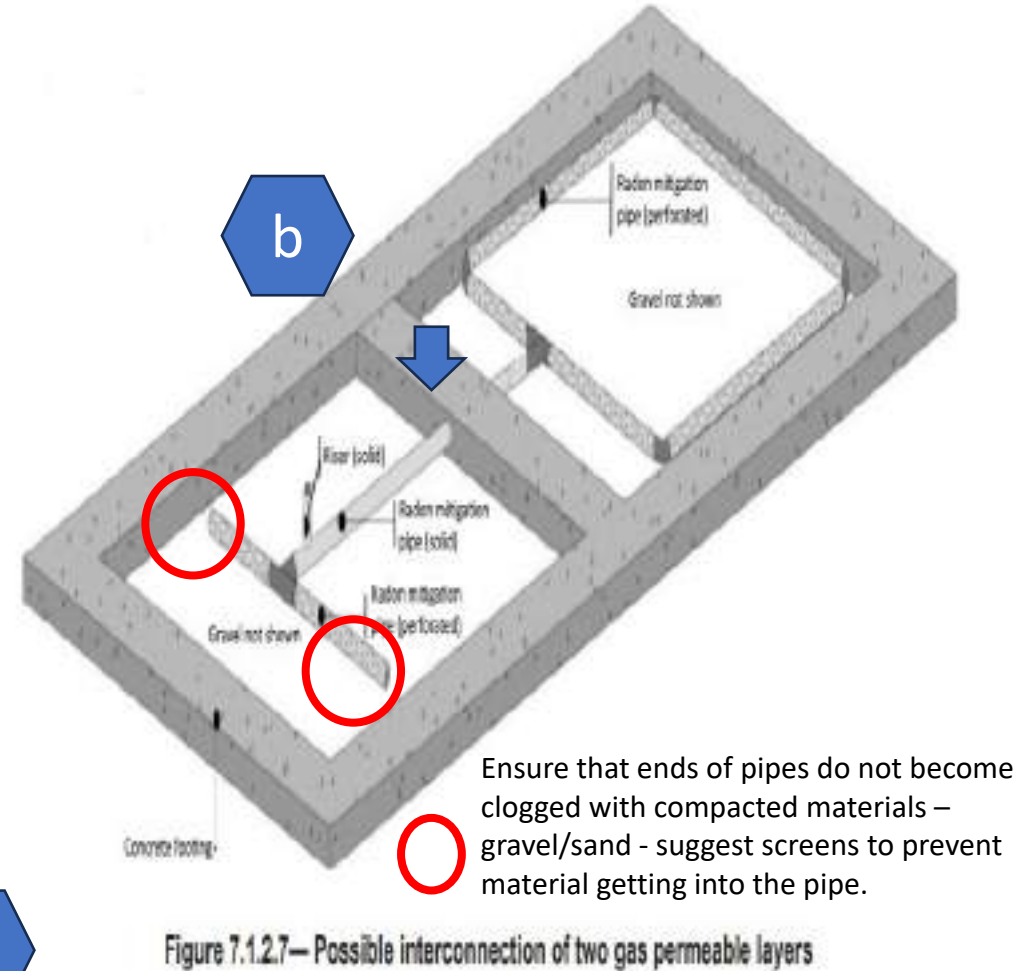


Figure 7.1.2.7— Possible interconnection of two gas permeable layers

**The Code is not specific on solid or perforated pipe under the slab.**



# 2024 BCBC – 9.13.4.3.(2)

## Sentence 9.13.4.3.(2)

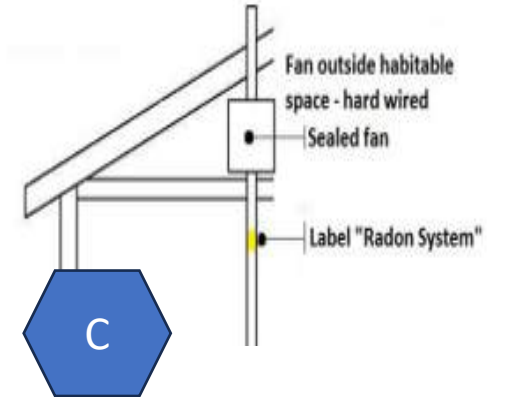
- c) permit connection to depressurization equipment,
- d) where it passes through conditioned space, be completely surrounded by conditioned space,



Exterior piping should be avoided as it can be damaged or be more susceptible to frosting. Also avoid garages and unheated crawl spaces.



Watch for other fixtures and appliances



Conditioned Space?

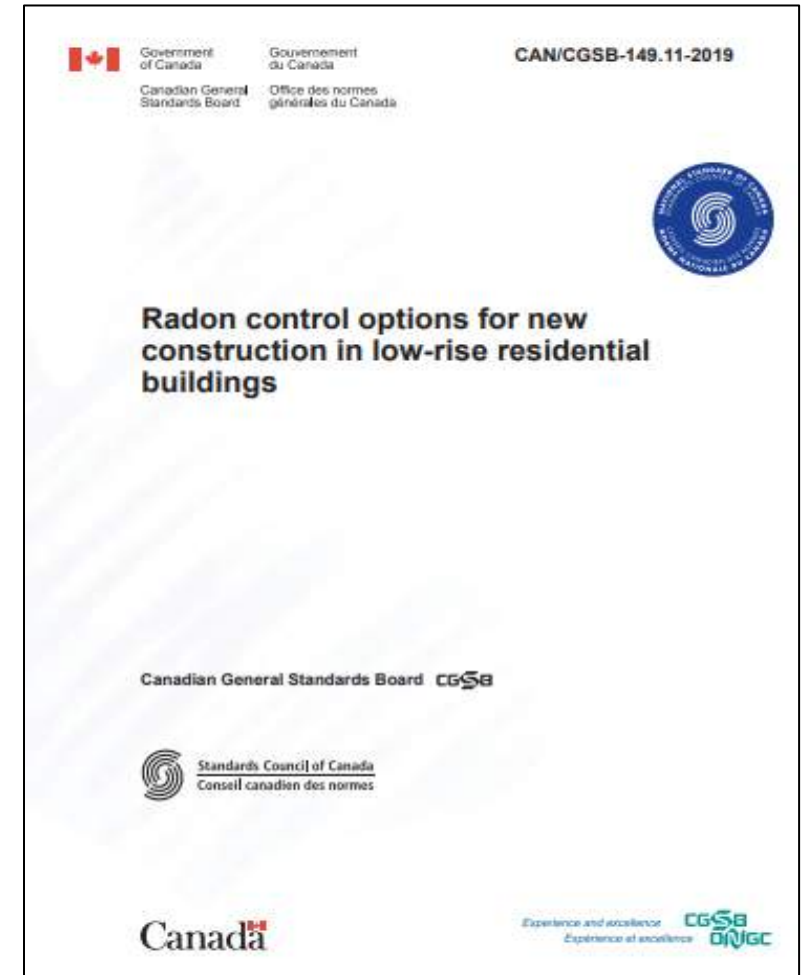




# 2024 BCBC – 9.13.4.3(2)

## Sentence 9.13.4.3.(2)

- e) consist of pipe and fittings in accordance with 7.1.3 of CAN/CGSB149.11, “Radon control options for new construction in low-rise residential buildings,” (see slides 38- 41)
- f) terminate outside the building in a manner that does not constitute a hazard,



Hazards could be openable windows, air intakes and proximity to property lines.



# CAN/CGSB 149.11 – 7.1.3.

## CAN/CGSB-149.11-2019 - 7.1.3 Pipe and fittings

7.1.3.1 The following are the minimum requirements for permitted pipe used in the construction of soil gas collector and suction points.

7.1.3.1.1 Pipes shall have a nominal internal diameter of not less than 10 cm (4 in).

7.1.3.1.2 The pipe material shall be resistant to the service environment or shall comply with 7.1.3.2.

7.1.3.1.3 PVC pipes installed completely or in part above grade shall comply with Schedule 40 specifications regarding wall thickness, inside and outside diameters and pressure ratings.

NOTE Where possible, radon pipe should have a different colour or identifying markings than DWV piping. Additional information on Schedule 40 pipe can be found in **ASTM E1465** and **ANSI/AARST RRNC 2.0**.



[PVC Soil & Radon Soil Gas Venting System | IPEX Inc. \(ipexna.com\)](https://www.ipexna.com)



# CAN/CGSB 149.11 – 7.1.3.

7.1.3.1.4 Where vertical pipe is installed in the cavity of a wood-frame or steel-frame wall, the top and bottom plates and any horizontal framing members (such as blocking) **shall have hidden steel shield plate** installed to protect the pipe.

7.1.3.1.5 **When pipe passes through a fire rated wall or ceiling, the base of its penetration on its fire rated side shall be fitted with an intumescent collar to maintain its fire resistance.**

7.1.3.1.6 Horizontal pipe runs shall be minimized. NOTE If horizontal runs are required, it is suggested that 22.5° fittings be used so that the stack momentum is maintained.

7.1.3.1.7 **Where horizontal pipe runs are necessary, pipes shall be supported as required by the local plumbing code for DWV piping.**

7.1.3.1.8 **Pipes shall be installed so as to minimize exposure to cold temperatures and shall be insulated where located in unconditioned space.**

**9.10.9.6. General Requirements for Penetrations of Fire Separations (See Note A-3.1.9.)**

**9.10.9.7. Piping Penetrations (See Note A-3.1.9.)**





# CAN/CGSB 149.11 – 7.1.3.

7.1.3.1.9 Horizontal pipes above and below ground shall be installed with at least a 1% slope to return water to the soil or according to Table 7.1.3.1.9.

**NOTE Vent pipes should be installed without depressions (traps) in which moisture can collect.**

Table 7.1.3.1.9 — Recommended Pipe Gradient at Various Flow Rates

Nominal Pipe Size ID (mm)	Flow Rate (L/s)	Recommended Gradient
100	10	1:100
100	25	1:50
100	50	1:30

7.1.3.1.10 The application of glues, cements, priming materials and pipe materials shall be selected according to the manufacturer's requirements for the applicable site conditions and service environment. All pipes, fittings, primer and cement products used in the same soil collector and suction point system shall be compatible.

NOTE Relevant SDS should be consulted before using glues, cements, primers, solvents, etc.

7.1.3.2 Acceptable pipe and fitting specifications

Where the pipe material conforms to one of the following standards, it shall be deemed to comply with 7.1.3.1.2 of this standard.



# CAN/CGSB 149.11 – 7.1.3.

7.1.3.2.1 PVC flue gas venting pipe and fittings shall meet the requirements of ULC S636 and all pipe, fittings and cement shall come from one manufacturer and the cement shall conform to manufacturer's specification and be adequate for the application conditions.

7.1.3.2.2 Pipe materials shall conform to one of the following standards: ASTM F891, CSA B181.1 or ASTM F628.

7.1.3.2.3 Pipes and fittings described in 7.1.3.2 shall be joined with products meeting the requirements of the respective pipe manufacturer.

7.1.3.2.4 Primer shall be applied where required.

7.1.3.2.5 PVC building drain sewer pipe shall meet the requirements of **CSA B182.1** and shall conform to SDR 35 specifications. Fittings shall be made of PVC and conform to the requirements of CSA B182.1. Pipes and fittings shall be joined with PVC solvent cement meeting manufacturer's specification and application conditions. This pipe shall only be used for below ground applications unless otherwise specified by the local authority.

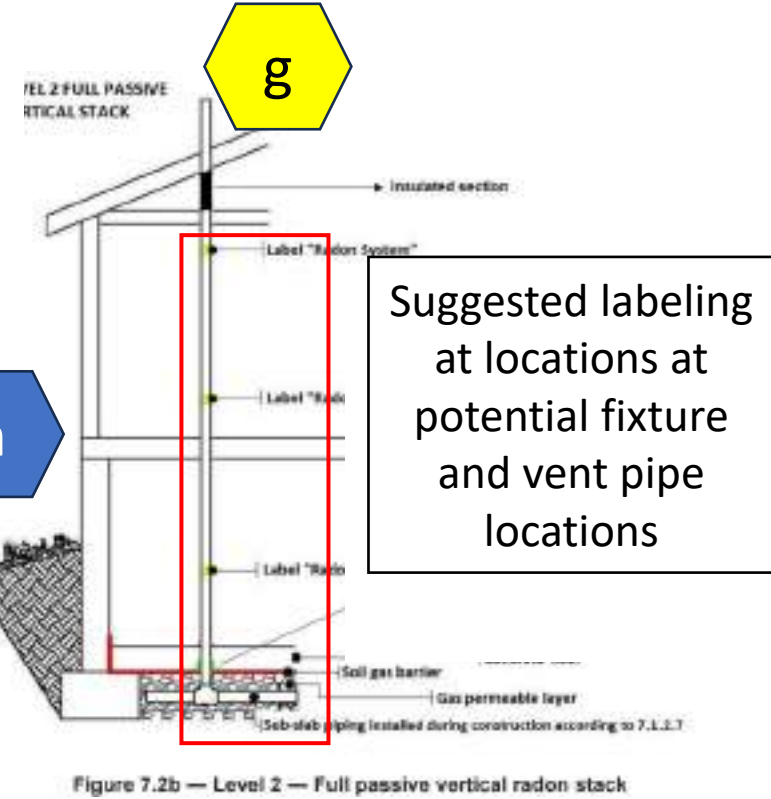


# 2024 BCBC – 9.13.4.3(2)

Refer to interior 7.1.3.1.9  
? Or exterior?

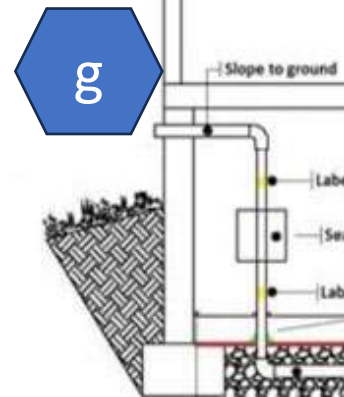
## Sentence 9.13.4.3.(2)

g) be installed to prevent the accumulation of moisture and away from locations where snow and ice accumulate, and  
h) be clearly labeled every 1.8 m and at every change in direction to indicate that it is intended only for the future removal of radon from below the floor-on-ground.



h

Check with your local CHBA chapter for stickers.



gg

Suggested labeling

Contact your local CHBA chapter for stickers.



(g) Member Question – is a hood required over the top of vent pipe to prevent moisture running down under slab?



## Poll Question - 6

Should there be weather protection (like a hood) at roof location ports to prevent moisture accumulating under slab?

- Yes – 83%
- No – 9%
- Not sure – 8%





# 2024 BCBC – 9.13.4.3(3)

**Sentence 9.13.4.3.(3) removed and replaced**

- 3) A radon vent pipe shall be deemed to comply with
  - a) Clause (2)(b) where its inlet or inlets below the air barrier system are located at or near the centre of the floor-on-ground with gas-permeable material extending not less than 100 mm beyond any inlet, and

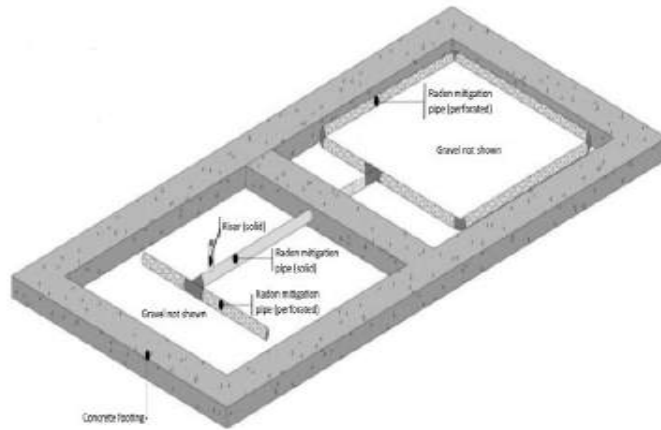


Figure 7.1.2.7— Possible interconnection of two gas permeable layers

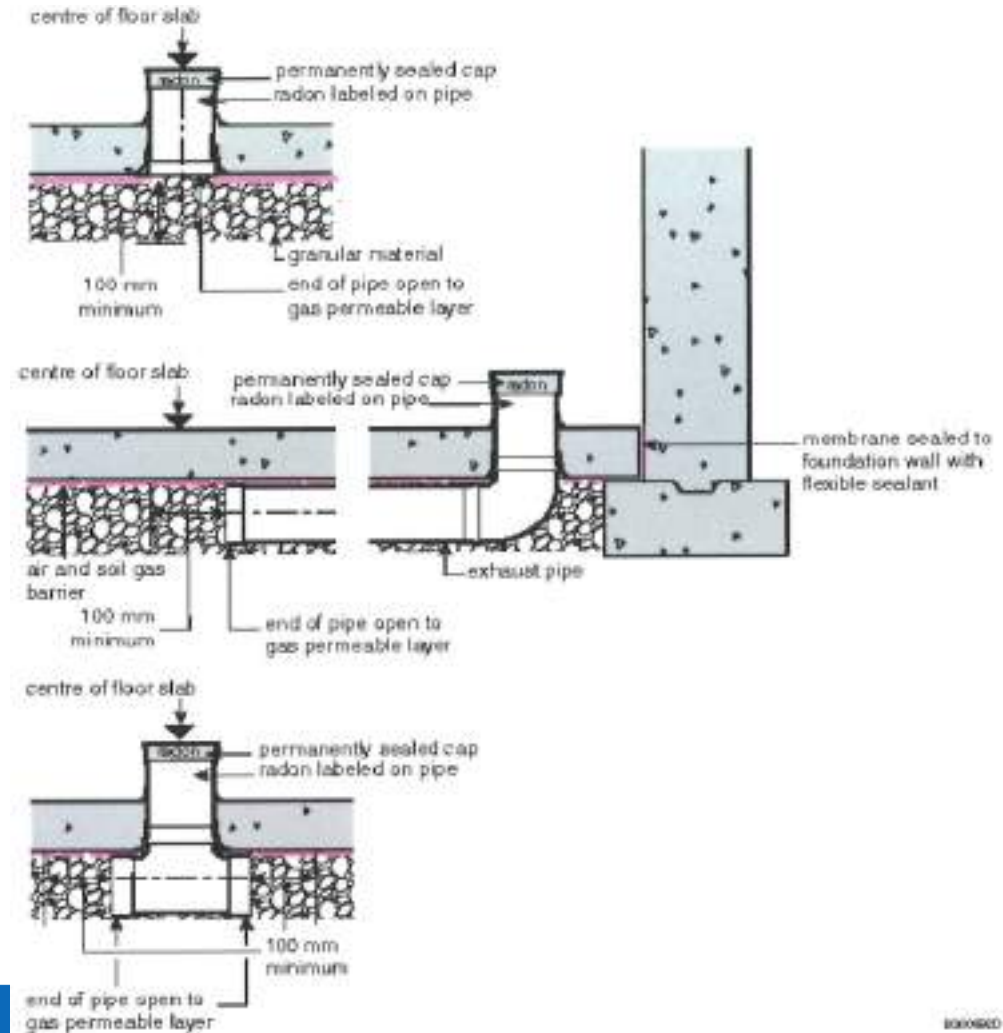


Figure A-9.13.4.3.(2)(b) and (3)(b)

Acceptable configurations for the extraction opening in a depressurization system

2024 Code Note should not show capped pipe.





# 2024 BCBC – 9.13.4.3(3)

## Sentence 9.13.4.3.(3) removed and replaced

- 3) A radon vent pipe shall be deemed to comply with b) Clause (2)(f) where it terminates outside the building, not less than 1.8 m from a property line, and located in accordance with either **7.2.4.6 or 7.3.4 of CAN/CGSB-149.11**, “Radon control options for new construction in low-rise residential buildings,” with the opening of the pipe fitted with a corrosion-resistant screen or grille with a mesh opening size of 10 mm to 12.5 mm or a product of equivalent air flow performance





# CAN/CGSB-149.11 – 7.2.4.6.

## CAN/CGSB-149.11-2019 - exterior roof pipe termination

7.2.4.6. The exterior pipe termination of the passive stack terminated above the roof top shall be directed vertically conforming to Table 7.2.4.6 and Figure 7.2.4.6

Table 7.2.4.6 — Minimum passive radon stack termination clearances for roof top discharge

Location	Minimum dimension (m)
Vertical clearance above the roof at the point of penetration	0.30
Vertical clearance <u>above</u> windows or doors	0.60
Vertical clearance <u>above</u> mechanical air supply inlet (air intake)	0.90
Horizontal clearance from windows, doors or mechanical air supply inlet	3
Clearance horizontally from a vertical wall that extends above the roof penetrated	3

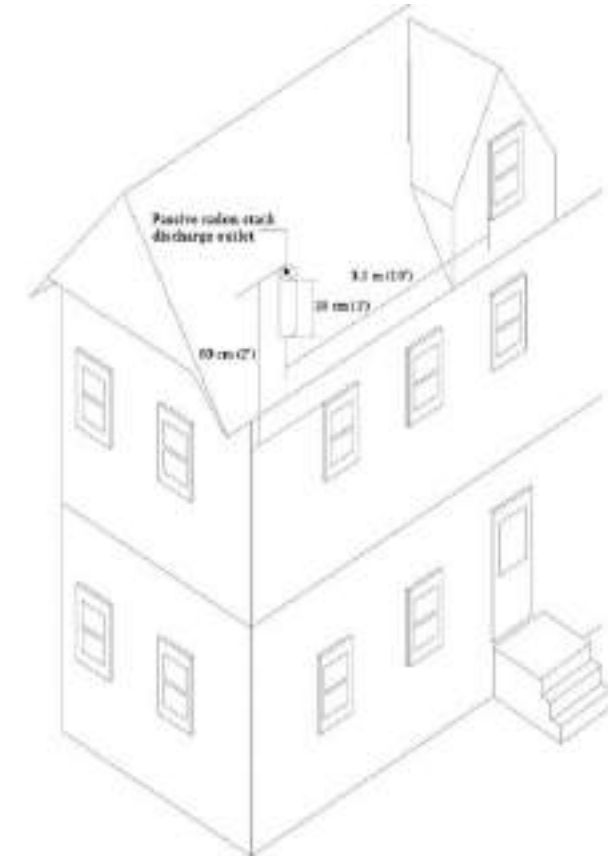


Figure 7.2.4.6 — Conceptual illustration of rooftop passive stack discharge geometry showing proximity to windows and height above roof

Required pipe termination clearances regardless of notation for “passive radon stack”



# CAN/CGSB-149.11 – 7.3.4.

## CAN/CGSB-149.11-2019 - also side wall termination

7.3.4.1 Active radon reduction systems shall discharge to the outdoors as shown in Figure 7.3.4a (roof top), in Figure 7.3.4b (gable end), or in Figure 7.3.4c (side-wall discharge near ground level).

7.3.4.2 Active radon reduction systems (Level 3) terminating above the roof (see Figure 7.3.4a) or via a gable end (see Figure 7.3.4b) shall have their fans located in the attic.

7.3.4.3 The three possible choices of active radon reduction system discharges above (roof top, gable end, or side-wall discharge near ground level) shall conform to the clearance distances shown in **Table 7.3.4.3**.

Table 7.3.4.3 — Clearance distances for active radon reduction systems

Locations	Suggested clearances (m)	Required minimal clearances (m)
Clearance to a mechanical air supply inlet	3	2
Clearance to permanently closed window	1	0.60
Clearance to a openable window	2	2
Clearance from a door that may be opened	2	1
Clearance to outside corner	0.30	0.30
Clearance to inside corner	0.30	0.30
Clearance above paved sidewalk or paved driveway located on public property	2	2
Clearance above grade, veranda, porch, deck, or balcony	1	0.30
Vertical Clearance below soffits or from any attic venting component	1	1
Horizontal clearance from an area directly below the discharge where there is a risk of injury from ice fall	2	1

Required pipe termination clearances regardless of notation for “active radon stack”

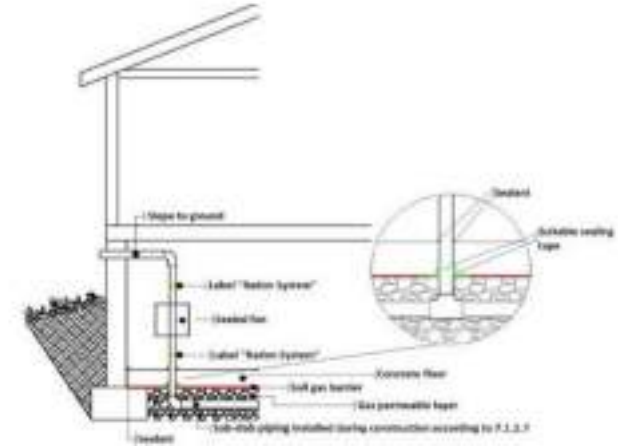


# CAN/CGSB-149.11 – 7.3.4.

7.3.4.3.1 The pipe shall be located where the discharged air and moisture will not directly strike surfaces on the property or adjacent properties. NOTE This is to prevent ice accumulation, frost, or water damage on those surfaces.

7.3.4.3.2 The pipe for a gable end discharge shall discharge horizontally with a minimal length of 50 mm (2 in) and a maximum length of 150 mm (6 in) protruding beyond the plane of the vertical structure. NOTE Care should be taken to ensure that the gable end discharge termination point is not located directly above a walkway to ensure that any ice that may form on the outlet of the pipe does not fall onto persons walking below.

7.3.4.3.3 An active system above roof discharge pipe outlet should not be installed in roof valleys or other locations where snow or ice are likely to accumulate.



Sidewall venting not ideal for passive but Code is only a rough in. 1.8m to PL.

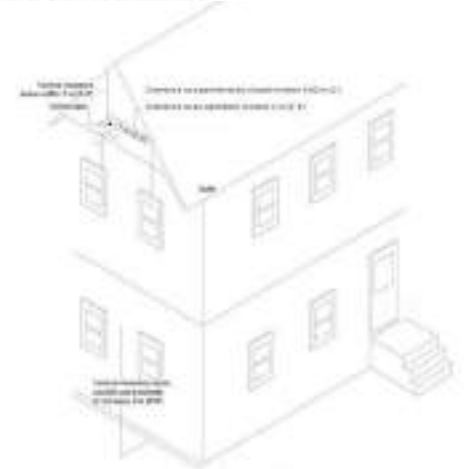


Figure 7.3.4b — Gable end roof discharge

Required pipe termination clearances regardless of notation for “active radon stack”





# 2024 BC Code – 9.25.3

## 9.25.3.1. Required Barrier to Air Leakage – NO Changes?

- 1) Wall, ceiling and floor assemblies separating conditioned space from unconditioned space or from the ground shall be constructed so as to include an air barrier system that will provide a continuous barrier to air leakage
- a) from the interior of the building into wall, floor, attic or roof spaces, sufficient to prevent excessive moisture condensation in such spaces during the winter, and
  - b) from the exterior or the ground inward sufficient to
    - i) prevent moisture condensation on the room side during winter,
    - ii) ensure comfortable conditions for the occupants, and
    - iii) minimize the ingress of soil gas. (See Note A-9.25.3.1.(1).)

## 9.25.3.6. Air Barrier Systems in Floors-on-ground

(See Note A-9.25.3.4. and 9.25.3.6.)

- 1) Materials used to provide a barrier to the ingress of air through floors-on-ground shall conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction."
- 2) Where the floor-on-ground is a concrete slab, the air barrier shall be
  - a) installed below the slab, or
  - b) applied to the top of the slab, provided a separate floor is installed over the slab.

(See Note A-9.25.3.6.(2) and (3).)
- 3) Where the air barrier installed below a floor-on-ground is flexible sheet material, joints in the barrier shall be lapped not less than 300 mm. (See Note A-9.25.3.6.(2) and (3).)
- 4) Where installed in conjunction with a framed floor-on-ground or above a floor-on-ground, the air barrier shall be installed in accordance with Article 9.25.3.3.
- 5) A floor-on-ground shall be sealed around its perimeter to the inner surfaces of adjacent walls using flexible sealant.
- 6) All penetrations of a floor-on-ground that are required to drain water from the floor surface shall be sealed in a manner that prevents the upward flow of air without preventing the downward flow of liquid water.





# 2024 BC Code – 9.25.3.6

## Air barrier details

CAN/CGSB-149.11-2019

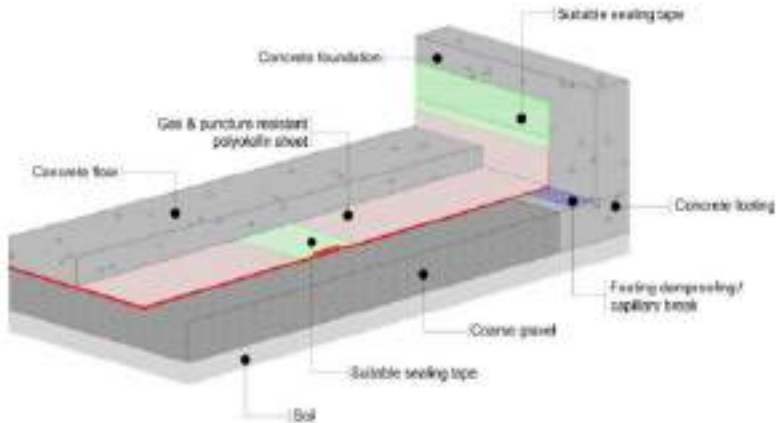


Figure 7.1.4.5.5 — Sealing sub-slab membrane vertically to concrete foundation wall

7.1.4.5.6 The soil gas barrier shall be sealed to the horizontal footings using appropriate sealing tape prior to the concrete slab pour. See Figure 7.1.4.5.6.

NOTE Damp proofing/capillary break shown in Figure 7.1.4.5.6 below is not a current code requirement, but may be regarded as a best practice, particularly where rigid insulation projects from the inside face of the foundation wall, including ICF walls.

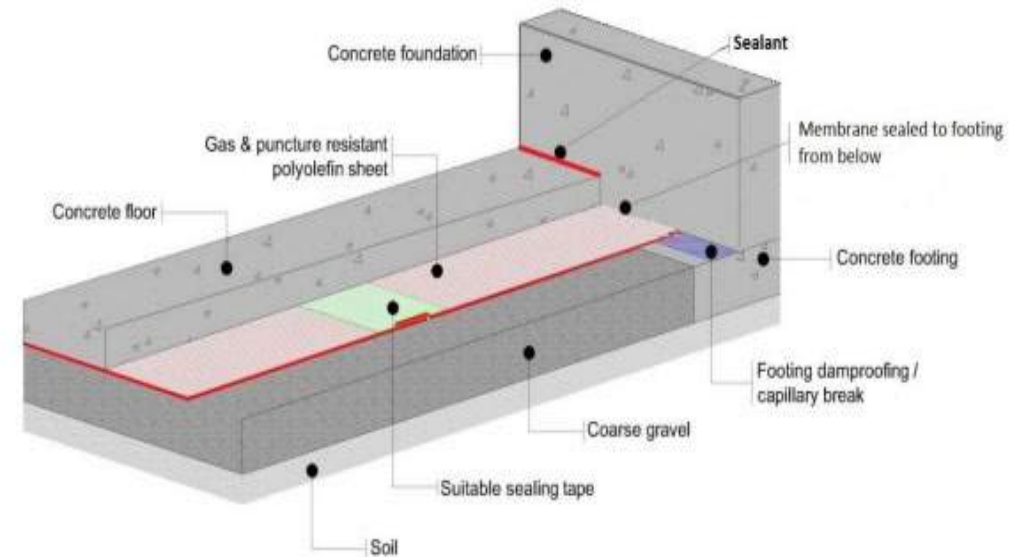


Figure 7.1.4.5.6 — Sealing sub-slab membrane horizontally to concrete footing prior to slab pour and of the slab/wall expansion joint after the slab pour

NOTE Damp proofing/capillary break shown in Figure 7.1.4.5.6 below is not a current code requirement, but may be regarded as a best practice, particularly where rigid insulation projects from the inside face of the foundation wall, including ICF walls.

Concrete slabs can shrink over half-inch (1.27 cm) for every 100 feet (30.5 m), so if the design is depending on sealing the edge – it's important to get the detail right – cove edge & rod/caulk.



CAN/CGSB-149.11-2019

# Details are Important— 9.25.3.6.

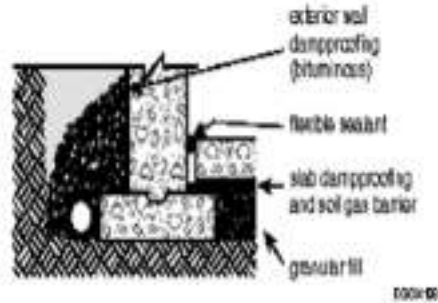
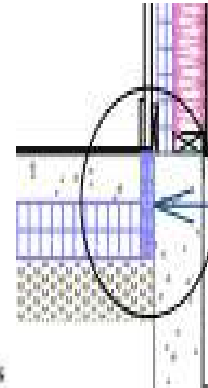


Figure A-9.25.3.4. and 9.25.3.6.-A

Dampproofing and soil gas control at foundation wall/floor junctions with solid walls



0.98 Rsi

9.36.2.8.(4)(b)(i) - 1.5" Xps 1.33 Rsi

Does anyone have a good detail for slab at grade?

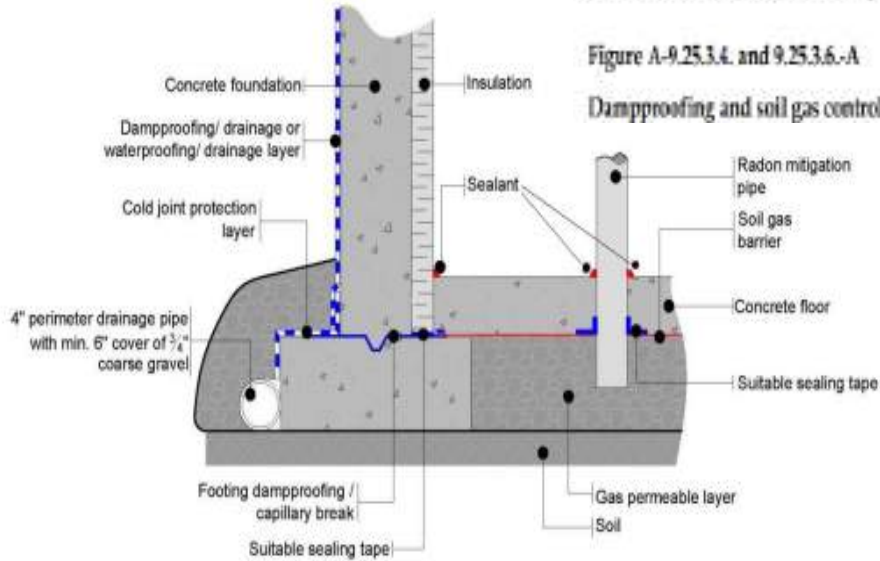


Figure 7.1.4.5.7 — Sealing sub-slab membrane horizontally to concrete footing when insulation is between the foundation wall and floor slab

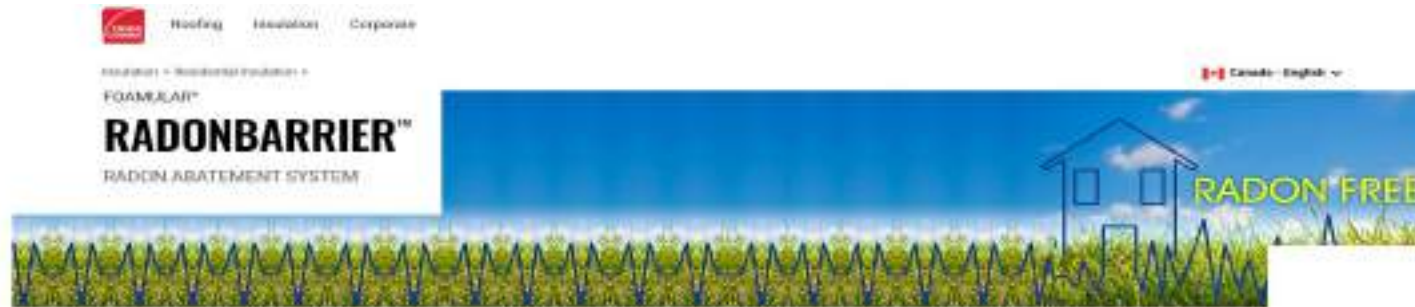


Edge Seal – Rod and Caulk

[https://www.youtube.com/watch?v=l2DI411\\_FTE](https://www.youtube.com/watch?v=l2DI411_FTE)

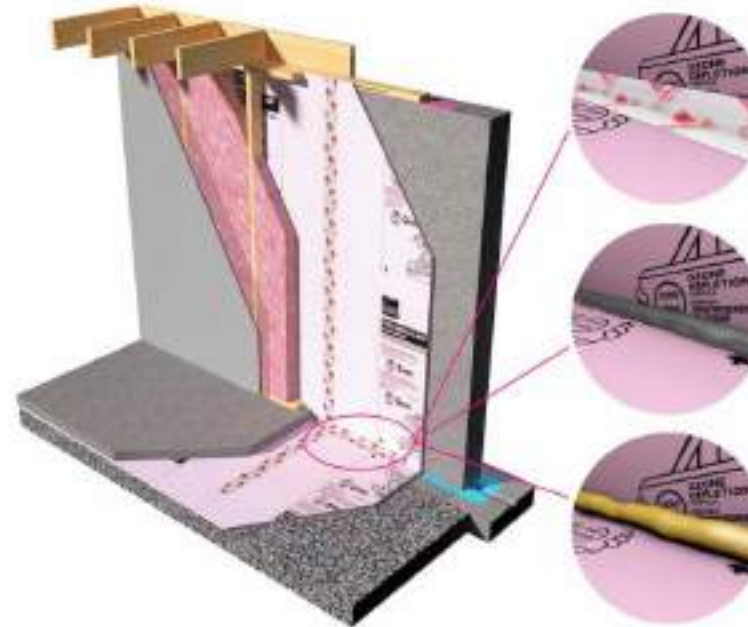


# 9.25.3.6. - Alternative



## HOW THE FOAMULAR® RADONBARRIER™ RADON ABATEMENT SYSTEM KEEPS RADON GAS FROM ENTERING THE HOME

- FOAMULAR® XPS and sealing components provide an effective radon barrier by significantly reducing radon gas from entering the living space by diffusion through the components
- The FOAMULAR® RadonBARRIER™ Radon Abatement System with sealed joints is a certified air barrier system effectively reducing radon gas from entering the living space through air leakage



SMOKE TEST VIDEO

[RadonBarrier Smoke Test Video™ / Essai à la fumée du Système RadonBarrier \(youtube.com\)](#)

What sections of the Code should this meet?  
[RadonBarrier Radon Abatement System | Owens Corning Insulation](#)



# Plan Review & Site Inspections

## Plan Review Requirements

- Indicate radon depressurization system – foundation/basement plan
- Pipes at all slab elevations and center of slab?
- Location of pipe system thru to roof with label requirements. Note fire separations.
- Provide air barrier details.

## Site Inspections

- Mandatory separate inspection recommended – any changes like separated slabs
- Granular material layer or alternative
- Air barrier details (plumbing knock outs) – did they follow the drawings?
- Piping requirements
- Fire blocking – fire separations?
- Labeling
- Exterior exhaust locations

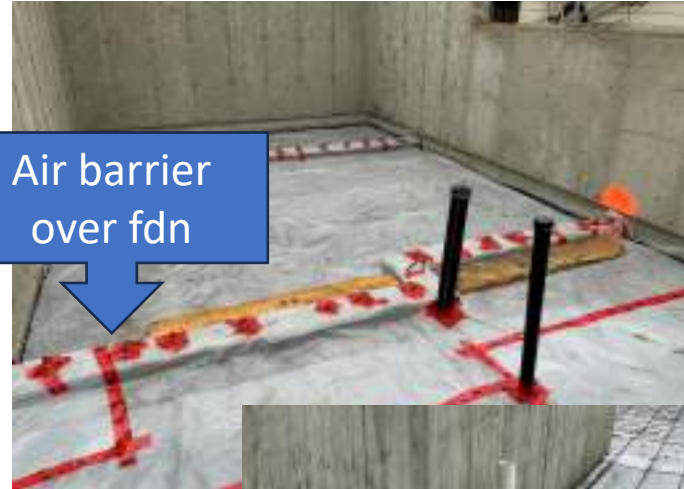
**Ensure that Code changes are detailed for applications of manufactured homes (over crawl spaces or basements)**





# Plan Review & Site Inspections

Good Install – Red Tape?



Air barrier  
over fdn



Not so good.



Sealed at ftg



Ensure air barrier completed a tub/shower knock and damaged out locations



# Next L&L Sessions

**March 21, 2024**

**Professional Practice  
& Consistency**

**April 25, 2024**

**Part 9 Fire  
Department Access**

**May - 2024**

**No Session  
BOABC Conference**



# Questions - Contact Us



**Session feedback &  
future topics**  
[kkunka@boabc.org](mailto:kkunka@boabc.org)



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