
Bulletin – 03/24: RADON requirements for Part 9 Buildings – 2024 Building Code

Forward:

Excerpt from Building & Safety Standards Branch Information Bulletin No. B24-03:

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. New data shows that radon exists in many areas of British Columbia where it was not previously known to result in elevated indoor levels. There is no longer reliable evidence to justify exempting certain areas from the radon rough-in requirement.

The National Building Code of Canada (NBC), upon which the Building Code is based, requires a passive radon mitigation system to be installed in all small (Part 9) residential buildings. The 2024 edition of the Building Code eliminates the previous exemptions for certain areas in British Columbia from the requirement for a radon rough-in for a subfloor depressurization system. All new houses are now required to provide a passive radon mitigation system.

See the following link for the complete B24-03 Bulletin: [RADON Rough-in Requirements for Part 9 Buildings](#)

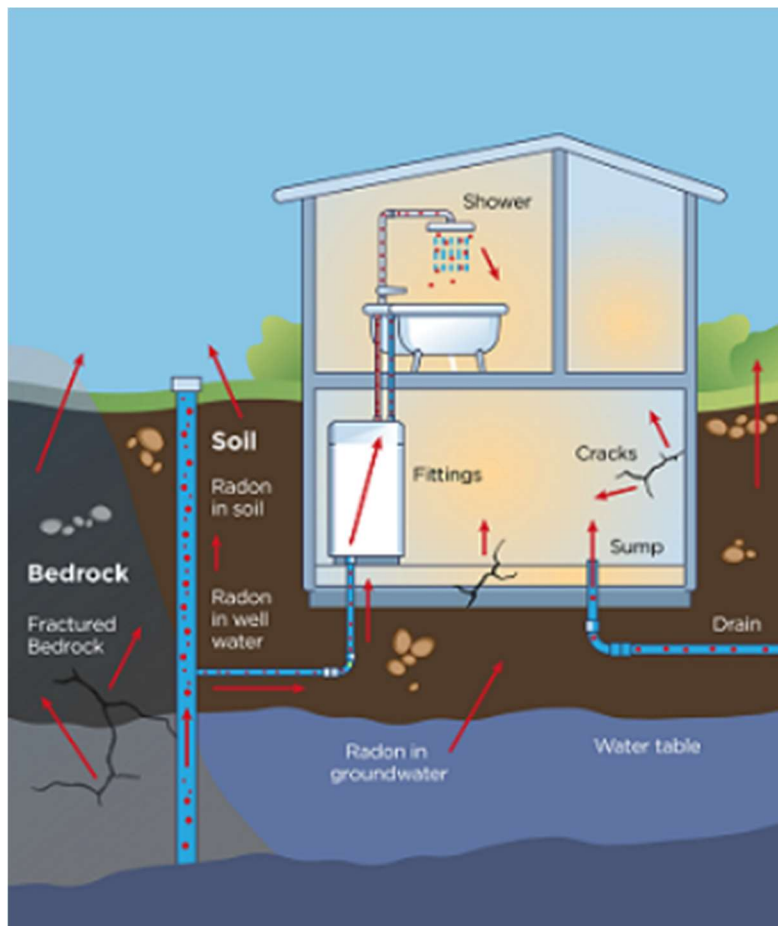
This bulletin is intended to provide clarification on the following:

- What is Radon – why should we care!
 - Under what circumstances does Radon need to be considered i.e. for new construction, additions, and other building types.
 - Radon Testing Information.
 - Radon Mitigation “code” requirements.
 - Radon Information Sheets
 - Additional Resources
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What is Radon – why should we care!

Radon is a naturally occurring colorless, odorless, radioactive gas that is released when uranium breaks down in soils and rocks. Radon released from the ground into outdoor air gets diluted and is therefore not harmful. However, radon is a problem in indoor settings, where it can build up and pose a risk to your health.

How can radon get into my home?



Radon enters buildings through cracks in the floors or at floor-wall junctions, gaps around pipes or cables, small pores in hollow-block walls, cavity walls, or sumps or drains. Radon levels are usually higher in basements, cellars and living spaces in contact with the ground. However, considerable radon concentration can also be found above the ground floor.

Being exposed to radon does not produce any immediate symptoms, but long-term exposure to radon – at any level but especially at high levels – can present serious health risks including lung cancer.

Under what circumstances does Radon need to be considered i.e. for new construction, additions, and other building types.

This recent change in the 2024 BC Building Code applies to new construction for Part 9 dwelling units (and additions) and new buildings containing residential occupancies where floor assemblies separate conditioned space from the ground. In addition to residential homes, these requirements apply to public buildings and workplaces with an occupancy of more than 4 hours per day – **this Bulletin is limited to new single-family dwelling's and new additions to SFD's.**

Radon mitigation systems are proven to reduce the likelihood of adverse health effects from radon, such as lung cancer. However, 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.

Therefore, it is the owner's responsibility to test their home upon occupancy to determine if an "active" radon mitigation system is necessary.

Radon Testing Information.

The BC Building Code now requires passive "extended radon rough ins". The approach here is that these systems can be upgraded (if necessary) once homes are occupied where testing of radon levels exceed Canada's Radon threshold of 200 Bq/m³.

It is the responsibility of the building/property owner to test for Radon once the home is occupied. There are two options for testing a house for radon:

1. You can purchase a do-it-yourself radon test kit at:



BC Lung

British Columbia - Provincial Organization

Tel: 604.731.LUNG

Email: radonaware@bclung.ca

Return Postage Additional Fee

Lab Fees: Included

Telephone Orders Not Accepted - Online Order

Option Only

Click here to [Order Online](#)

Testing for Radon is about protecting your family’s health, so it’s important to get it right and consider the following criteria when selecting your Radon test kit:

- Choose a radon test kit that’s been approved.
- Choose a long-term radon test kit for 91 days or more.
- Once you receive your kit, be sure to follow the instructions carefully.

2. Hire a radon measurement professional.

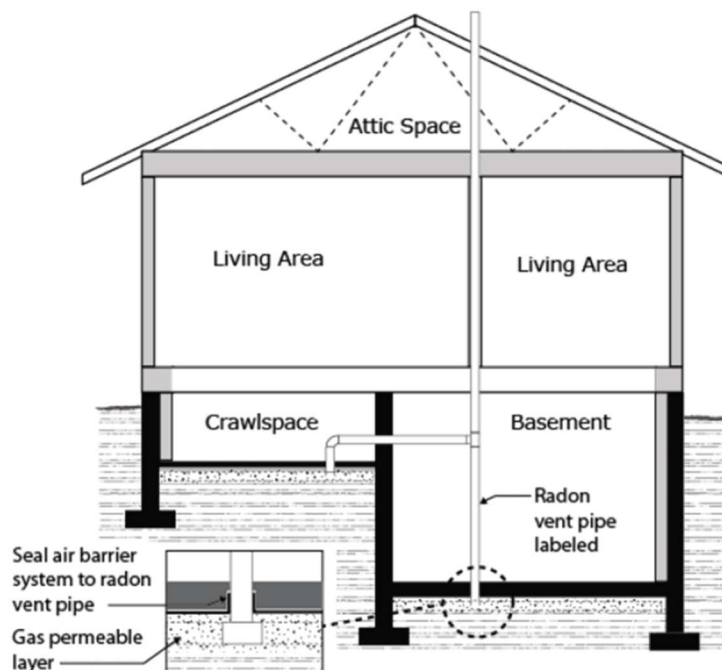
Click here to find a professional in your area [Radon Professional](#)

See the following [Guide for Radon Measurements in Residential Buildings](#)

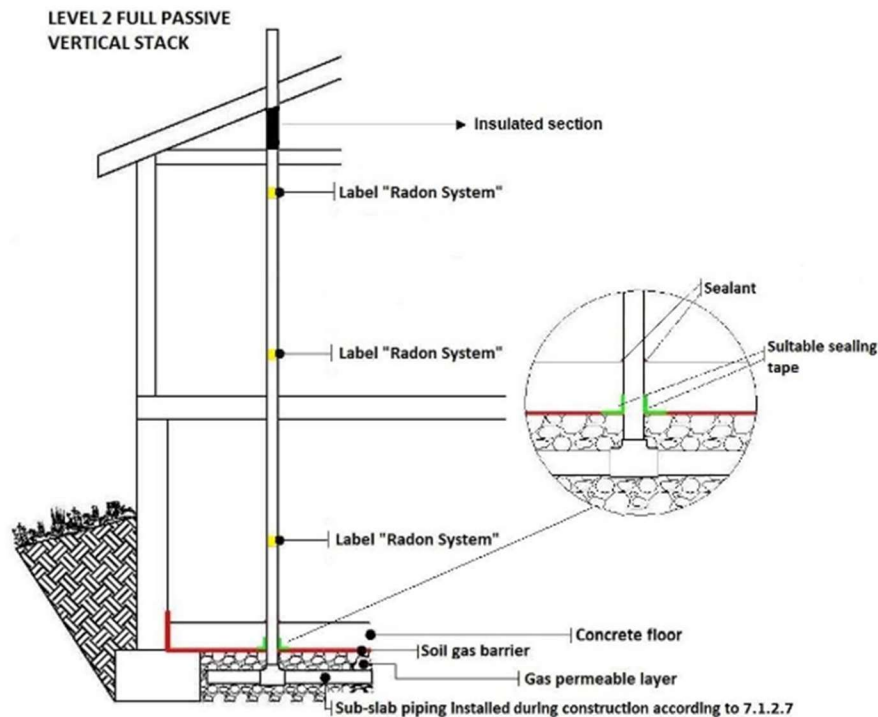
Radon Mitigation the “code” requirements.

The 2024 BC Building Code requires a passive soil depressurization system. This soil depressurization system allows space for the movement of soil gases between the ground and the air barrier system (underneath the slab). This sub slab depressurization system is connected to a 4” solid pipe that extends up and through the roof surface. This is called as a Passive Radon Mitigation System. The following information focuses on the Passive System.

Full Passive Vertical Radon Stack (with a crawlspace)



Full Passive Vertical Radon Stack (basement)



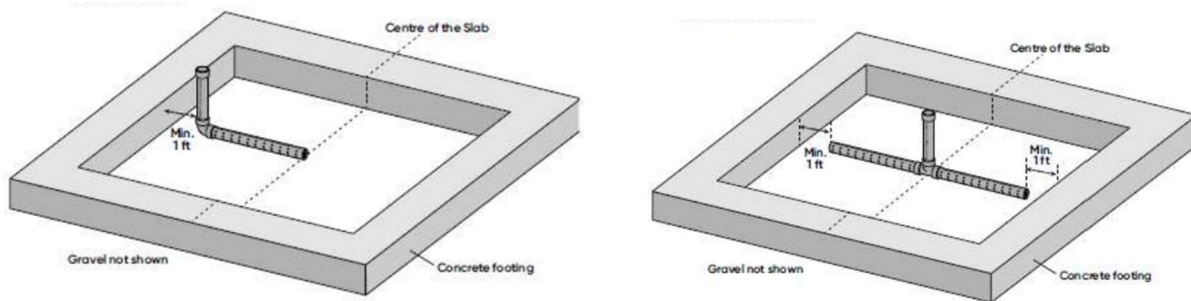
These images demonstrate the installation of a full **passive** vertical radon stack – new construction radon prevention measure. A pipe is installed through the foundation floor and into a soil gas collector granular layer, that rises vertically up through the conditioned space and terminates above the roof membrane to allow for the radon gas to be released outdoors. A membrane (6 mil poly) is installed underneath the concrete slab which is sealed to the foundation wall and around all penetrations to minimize radon ingress. This system relies on naturally occurring pressure differentials generated by the stack effect and subsequent discharge of soil gas to the outdoors through the radon pipe thereby reducing indoor radon.

Soil Gas Collector Layer/Pipe (sub-slab):

This layer is placed beneath the slab or flooring system to allow the soil gas to move freely underneath the slab or flooring system. The most common method is to install a 100mm layer of coarse clean granular material containing not more than 10% of material that would pass a 4mm sieve.

When planning your sub slab depressurization system, it is very important that you do not create any trapped or isolated areas surrounded by solid footings. Either add a 4" sleeve through the footing(s) or install a 4" vertical riser from each area that extends at least 6" above the finish slab.

An additional soil gas collector pipe shall be installed horizontally within the gas permeable layer. The inlet of the solid horizontal radon mitigation pipe located beneath the slab should start near the center of the floor slab that extends and connects to the vertical riser. For every 500ft² of the building footprint, a minimum of 3m (10ft) of perforated pipe shall be used in the sub slab area (as shown below):



Approved pipe and fittings for the sub-slab collector pipe (and above slab) shall be certified to one of the following standards:

- ASTM F628 (cellular core ABS)
- ASTM F891 (cellular core PVC)
- CSA B181.1 (solid wall ABS)
- CSA B182.1 and be SDR35 (BDS/Drain tile PVC). *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.*
- ULC S636 (flue gas venting). *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.*

**PVC vent pipes must comply with Schedule 40 specs regarding wall thickness, inside and outside diameters and pressure ratings.*

**All pipes shall have a Nominal ID not less than 4".*

Gas Permeable/Air Barrier System for floors-on-ground:

A flexible vapour membrane is typically used as an effective air-barrier. This membrane is placed on top of the soil gas collector layer just under the slab to help prevent the soil gas from entering the home.

Materials used to provide a barrier to the ingress of air through floors-on-ground are required to conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction." All joints in the membrane shall be lapped not less than 300mm and sealed with an approved tape or flexible membrane. All pipe or service penetrations through the air-barrier must also be properly sealed.

After the floor slab has been poured the sub slab air barrier must be made airtight by sealing the floor slab to the foundation wall.

The Passive Stack:

The passive stack starts at the connection of the stack to the vertical riser.

Approved pipe and fittings (above the slab) must be certified to one of the following standards:

- ASTM F628 (cellular core ABS)
- ASTM F891 (cellular core PVC)
- CSA B181.1 (solid wall ABS)
- CSA B182.1 and be SDR35 (BDS/Drain tile PVC). *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.*
- ULC S636 (flue gas venting). *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.*
 - *PVC vent pipes must comply with Schedule 40 specs regarding wall thickness, inside and outside diameters and pressure ratings.*
 - *All pipes shall have a Nominal ID not less than 4".*

Below is a list of some of the additional and important requirements for the passive stack pipe installation:

□ The application of glues, cements, priming materials and pipe materials shall be selected according to the manufacturer's requirements specific to the type of pipe selected. Therefore, all pipes, fittings, primer and cement products used in the system shall be compatible.

□ Where possible, Radon pipe "*should*" have a different color.

□ Radon pipe labelling is required for all Radon pipe above the ground/slab (weather they are a different color or not). Radon labels shall be placed every 1.8m (6ft) and at every change of direction to clearly differentiate the Radon pipe from DWV piping.

□ Any portion of the passive stack passing through unconditioned space (i.e. an attic) shall be insulated to a minimum thermal resistance of $2.47 \text{ m}^2\text{K/W}$ (R-12) to maintain the stack effect flow momentum and to minimize condensation on the inside of the pipe.

□ Any portion of the passive stack passing through habitable space shall be located within walls that are completely surrounded by conditioned space.

□ Where a vertical Radon 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.

□ The BC Building Code does not require the installation of a fan during initial construction, although designers must consider the future installation of a fan which will require access and electrical supply somewhere along the radon vent pipe in accordance with the following:

- 1 m (3.3 ft) of space in each direction including vertically, is sufficient to cut the pipe and install a fan.
- A branch electrical circuit receptacle shall also be located within 1.8 m (6 ft) of the portion of the passive stack.

Note: typical installation is in an enclosed mechanical room or an accessible attic space.

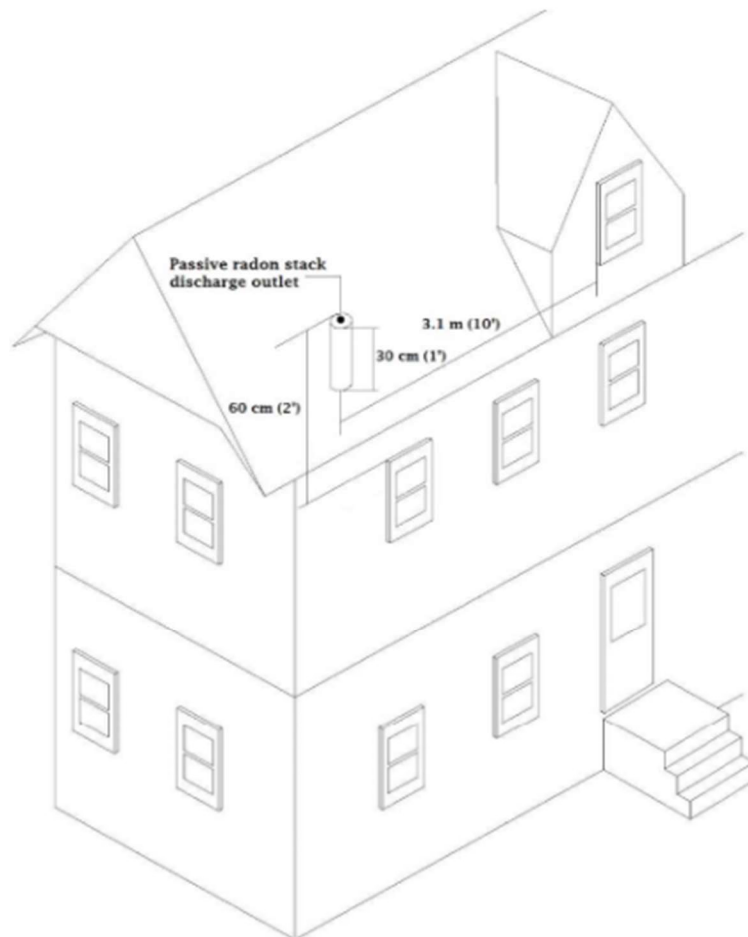
□ Wherever possible passive stacks shall be installed in the vertical direction. If necessary, horizontal offsets in the passive stack shall be made with 22.5° fittings.

□ At the discretion of the Building Official, a test of the pre-assembled portion of the passive stack may be requested by one of the following two methods:

1. The standard hydraulic test consists of capping the bottom end of the passive stack column and filling it with water from the top end. The pipe system shall be visually inspected for leaks while the water level is maintained for 15 minutes.
2. The standard air pressure test consists of pressurizing the passive stack sealed at both ends to 35 kPa (5 psi). The pressure shall be maintained for 15 minutes, and the pipe system shall be inspected for pressure loss by conducting a soap test on each joint.

□ The passive stack for the radon reduction system shall terminate outdoors.

□ Radon pipe terminations must penetrate the roof and be no less than 1.8m (6ft) from a property line. See below diagram for clarity:



- The exterior pipe termination of the passive stack terminated above the roof top shall be directed vertically in accordance with the following:

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

- The opening of all Radon discharge pipe types, shall be fitted with a protective 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.
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Radon Information Sheets

Upon completion of the project, a Radon control systems “Information Sheet” shall be provided to and for the purpose of informing the homeowner. Please refer to the CAN/CGSB-149.11-2019 Standard Section 8.2 Radon maintenance and information sheets. See level II passive extraction system below:

Level 2

Radon reduction system

Radon system specification: CGSB _____

Type: Level 2 Full passive vertical radon stack

Status: System operational, Monitor operational

Upgrade option: Convert to active system with fan.

Description: A passive (without a fan) radon soil depressurization system has been designed, installed, and is operating in this building.

Radon testing: This system has been installed to the industry's best practices. However, for various reasons, radon levels may be elevated. Test the building for radon during the first winter after occupancy using a long-term radon test (three months). The building should be re-tested for radon every five years, or as recommended by Health Canada.

Also, retest the building for radon whenever there has been a change in ownership, of heating, cooling or ventilation equipment, or after renovations or additions have been completed.

Radon testing interpretation: If radon test results are above 200 Bq/m³, take steps to activate your radon reduction system as soon as is reasonably possible. Contact Health Canada for more information (contact information is provided below).

Homeowner maintenance: Some components of this radon reduction system require maintenance and monitoring by the homeowner. For installation information or installer service or maintenance, please contact the following:

Installer's name:

Company:

Company address:

Company telephone number:

Applicable certification Identification:

Date of installation:

Signature:

Additional radon information: Visit the Health Canada Website www.Canada.ca/radon or call 1-866-225-0709 for more information on radon and your reduction system.

Additional Resources

2024 British Columbia Building Code: [2024 BC Building Code](#)

STANDARD - Radon Control Options for New Construction in Low-rise Residential Buildings CAN/CGSB-149.11-2019: [Radon Control CAN/CGSB-149.11-2019](#)

Government of Canada – Guide for Radon Measures in Residential Dwellings (Homes): [Guide for Radon Measurements in Residential Buildings](#)

Building & Safety Standards Branch, Information Bulletin for – Radon Rough-in Requirements: [RADON Rough-in Requirements for Part 9 Buildings](#)

Find a Radon Professional in your area: [Radon Professional](#)

BC Lung Foundation, Order a Radon Test Kit Online: [Order Online](#)

**The information included in this document Credits all the above noted resources.*