Radon and Energy Efficiency: EAs making the connection

November 19, 2024

CACEA Canadian Association of Consulting Energy Advisors

Purpose

An information session to equip EAs with:

- An understanding of radon as it applies to retrofits and new construction
- Build awareness about radon with clients
- Enable EAs to provide knowledgeable information that contributes to informed decisions and actions

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Your Presenters

FACILITATOR

Andrew Laroche

Registered Home Inspector
AmeriSpec of Mississauga

PRESENTER

Anne-Marie Nicol PhD

Associate Profession,
Simon Fraser University, Faculty of Health Sciences

PRESENTER

Toby Smith MEA

Senior Project Manager
Building Knowledge Canada

PRESENTER

Pam Warkentin

Executive Director
Canadian Association of Radon Scientists and Technologists

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Agenda

1. What is Radon?
2. Health Effects
3. Building Science Impacts
4. Testing Procedures
5. Radon Prevention and Barrier Systems
6. Reducing Radon (Mitigation)
7. Building Code Requirements
8. Communicating with Customers
9. Resources

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What is Radon?

Pam Warkentin

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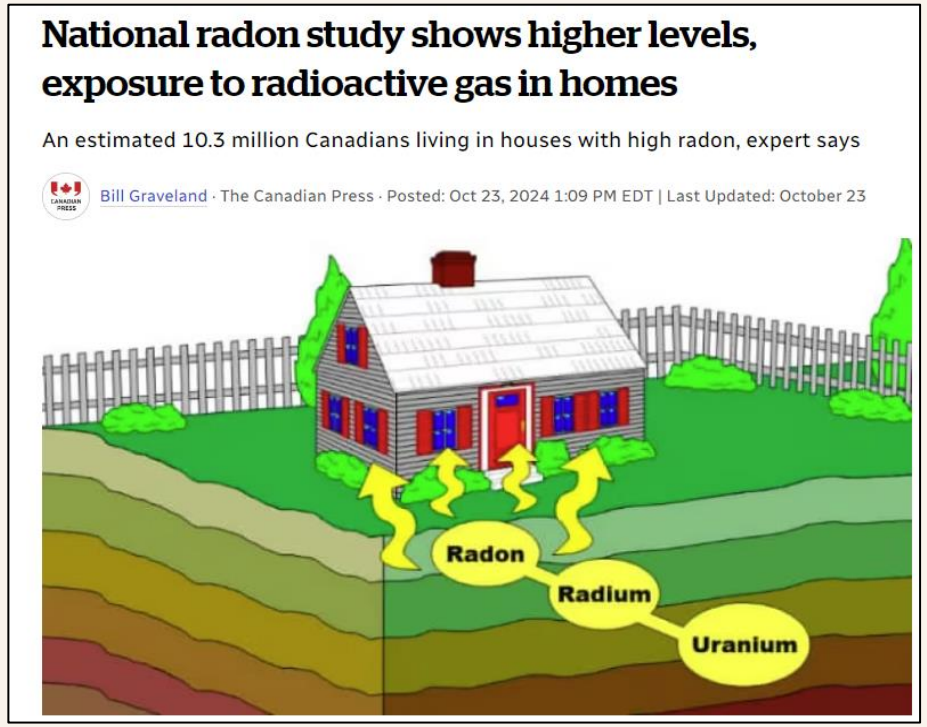
In the News and In Your Mailbox



https://www.cbc.ca/news/canada/calgary/report-radon-canada-homes-public-health-1.7360707

Take Action on Radon
https://knowvember.ca/en/

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Radon is the leading cause of lung cancer in non-smokers, leading to over 3000 deaths per year in Canada.

Radon enters a home through contact with the ground and can build up to elevated levels.

Exposure to elevated levels of radon is linked to increased chances of developing lung cancer.

Images courtesy of CARST

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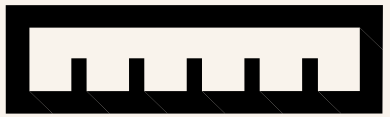
Measuring Radon



- Becquerel (Bq) = measure of radioactive decay
- 1 Bq/m^3 = 1 radioactive disintegration per second per cubic meter of air
- Radon gas = invisible, tasteless and odourless
- Testing is only way to know how much is in a building

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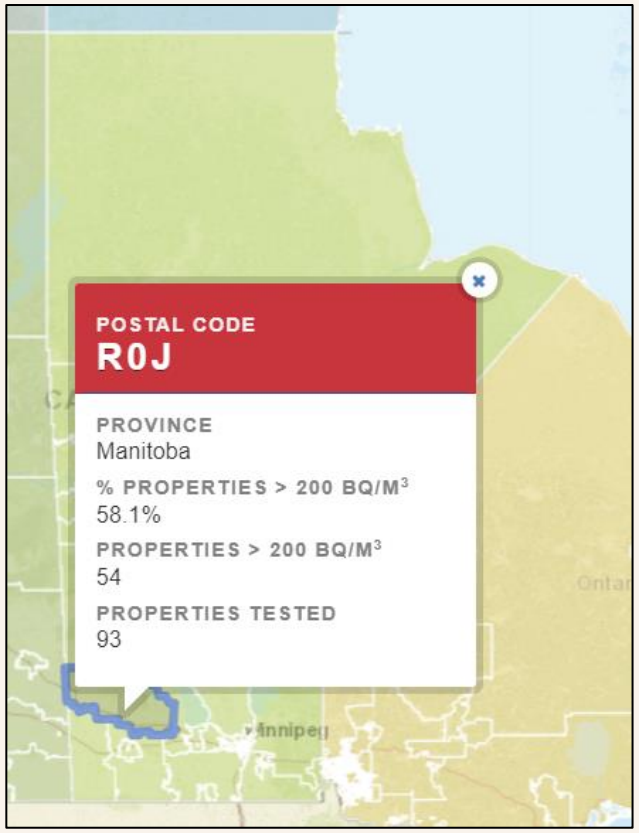
C-NRPP Radon Map

- A tool but not absolute



https://c-nrpp.ca/radon-map/?center%5B%5D=58.81374171570782¢er%5B%5D=-94.482421875&zoom=4

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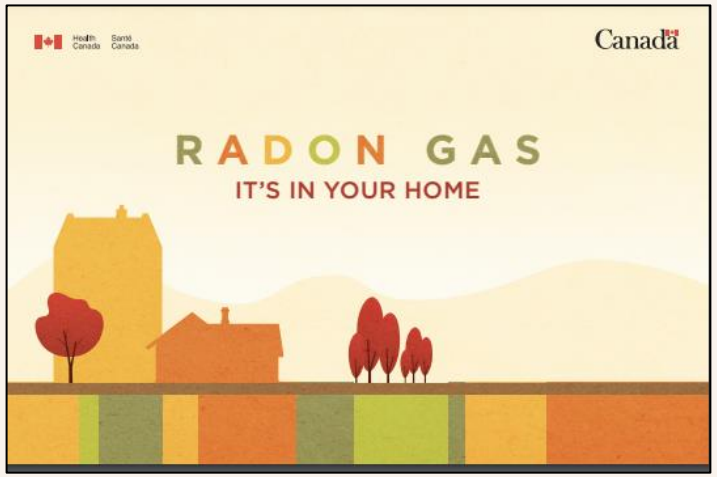
Radon Levels?

- Health Canada recommends testing all buildings and high levels reduced
- Government of Canada recommends action when 91-day tests are above 200 Bq/m³



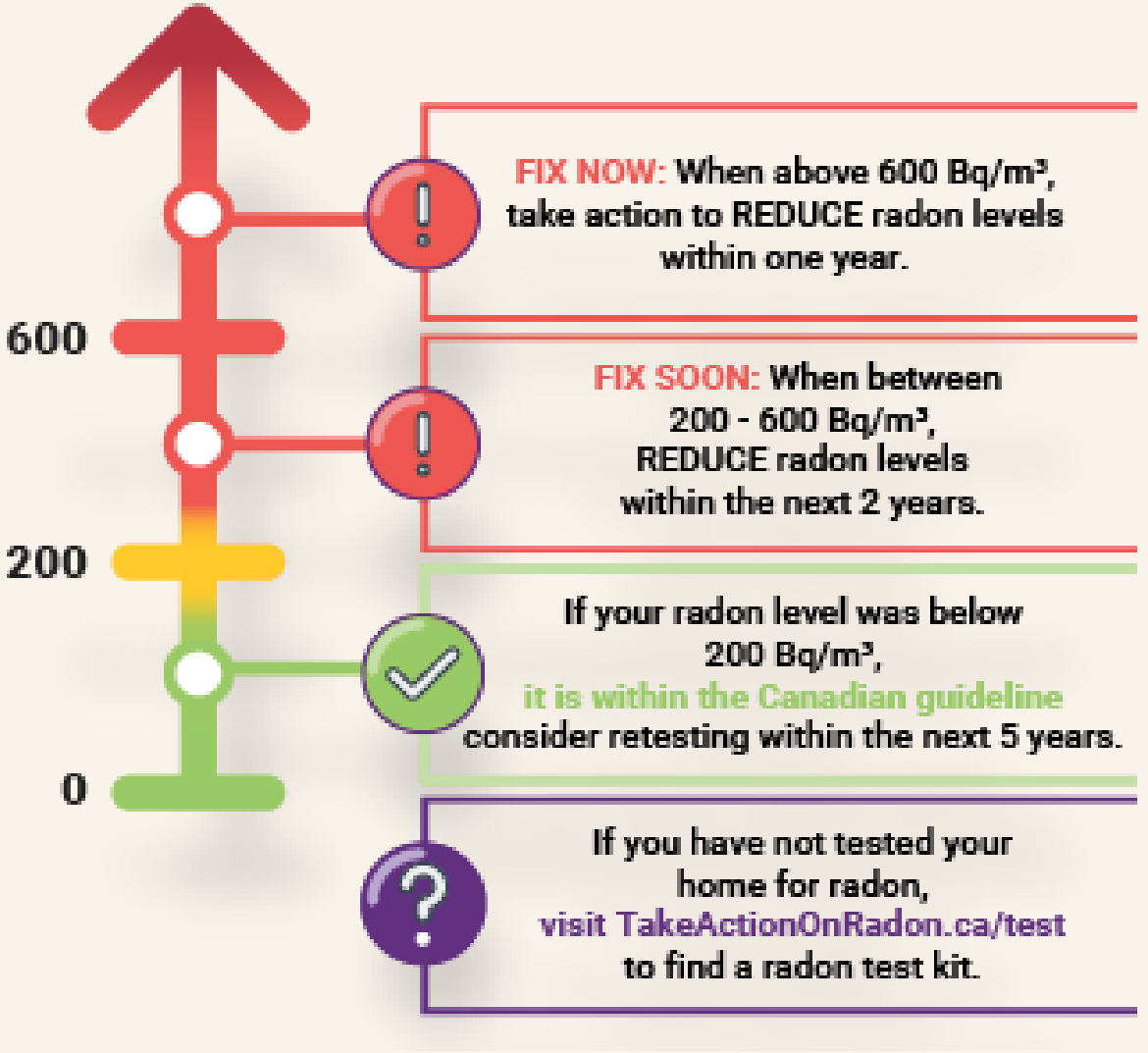


Image courtesy of CARST/Take Action Campaign

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Health Effects

Anne-Marie Nicol & Pam Warkentin

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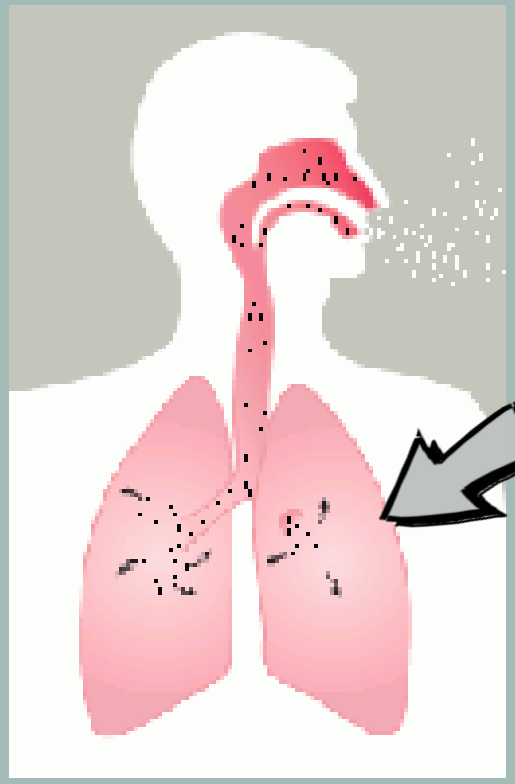
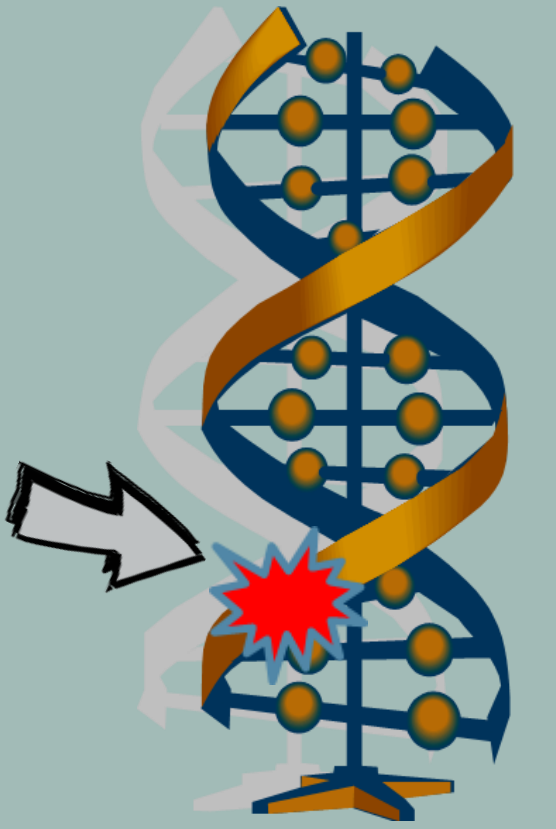
Health Impacts of Radon



Inhalation of radon and radon decay products

Alpha Particle



Radiation Damage to DNA

Damage to the DNA = Mutation = Cancer

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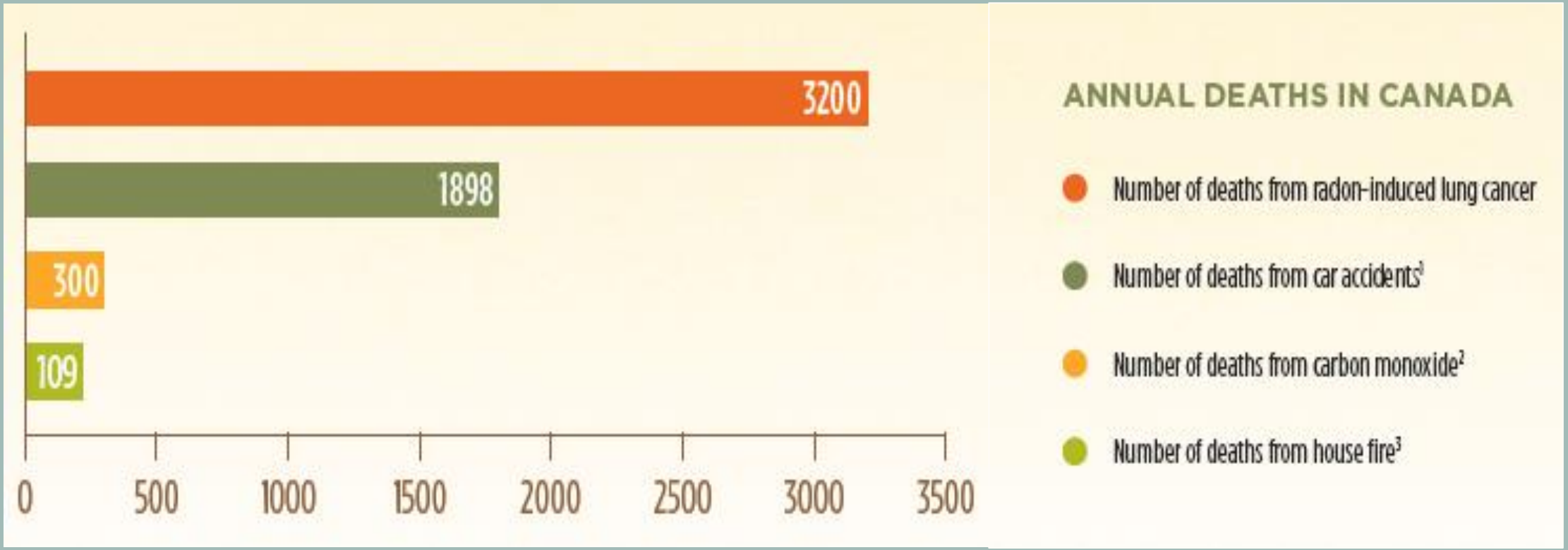
Lung Cancer Deaths



References:
1.www.tc.gc.ca/en/services/road/publications/canadian-motor-vehicle-traffic-collision-statistics-2016.html
2.www.injuryresearch.bc.ca/wp-content/uploads/2017/10/Carbon-Monoxide-Oct-2017-Final-UFV.pdf
3.www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3510019501

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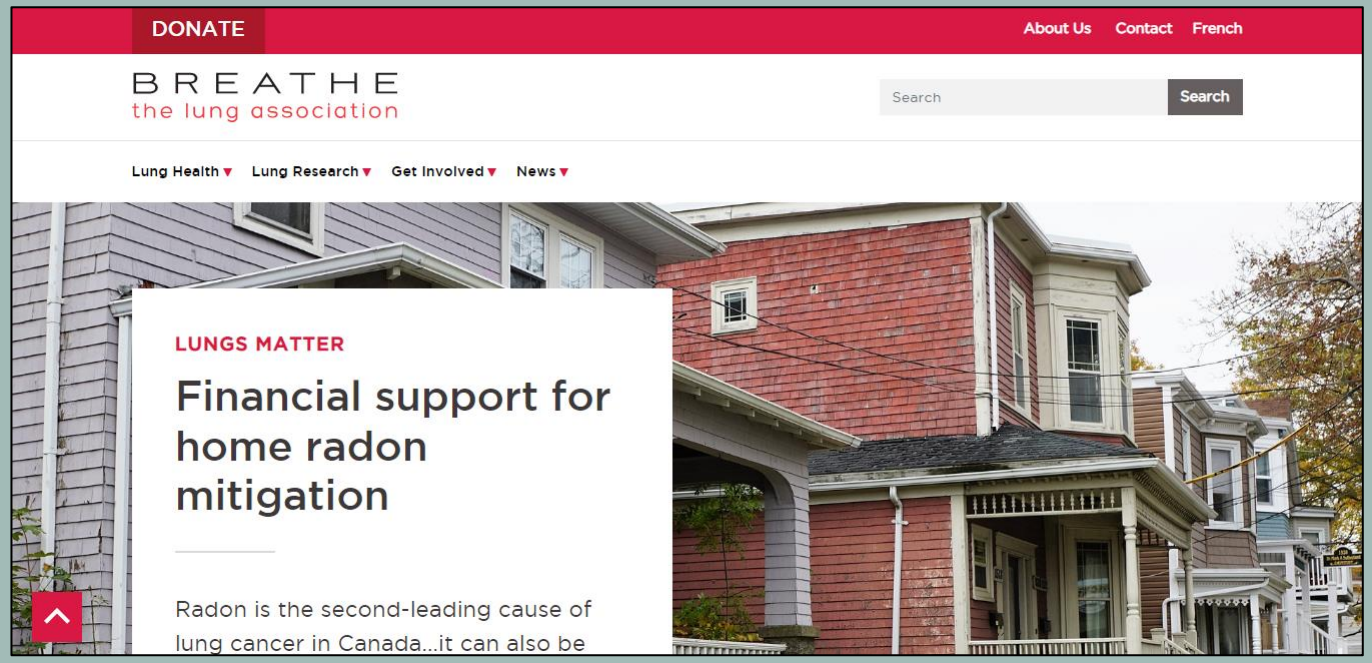

The **Canadian Lung Association** has a grant program to help people across Canada afford radon mitigation services. The *Lungs Matter Grant Program* provides financial support to individuals diagnosed with lung cancer and those considered a low-moderate income households (priority given to low-income households.)

To apply for the grant a homeowner must do the following:

- Complete a 91-day long-term test **(not a digital monitor)**
- Receive a quote from a C-NRPP Mitigation Professional **(before work is started)**
- Receive confirmation of qualifying for the grant, **(household income or proof of lung cancer diagnosis)**

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https://www.lung.ca/lungs-mtter-radon-mitigation-support

Building Science Impacts

Anne-Marie Nicol & Toby Smith

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Energy Efficiency Upgrades and Radon

- Renovating home can change radon levels
- Increased air tightness may concentrate radon levels
- Some types of ventilation may reduce radon levels, others not
- Important to understand what is happening inside the home = **BUILDING SCIENCE!**

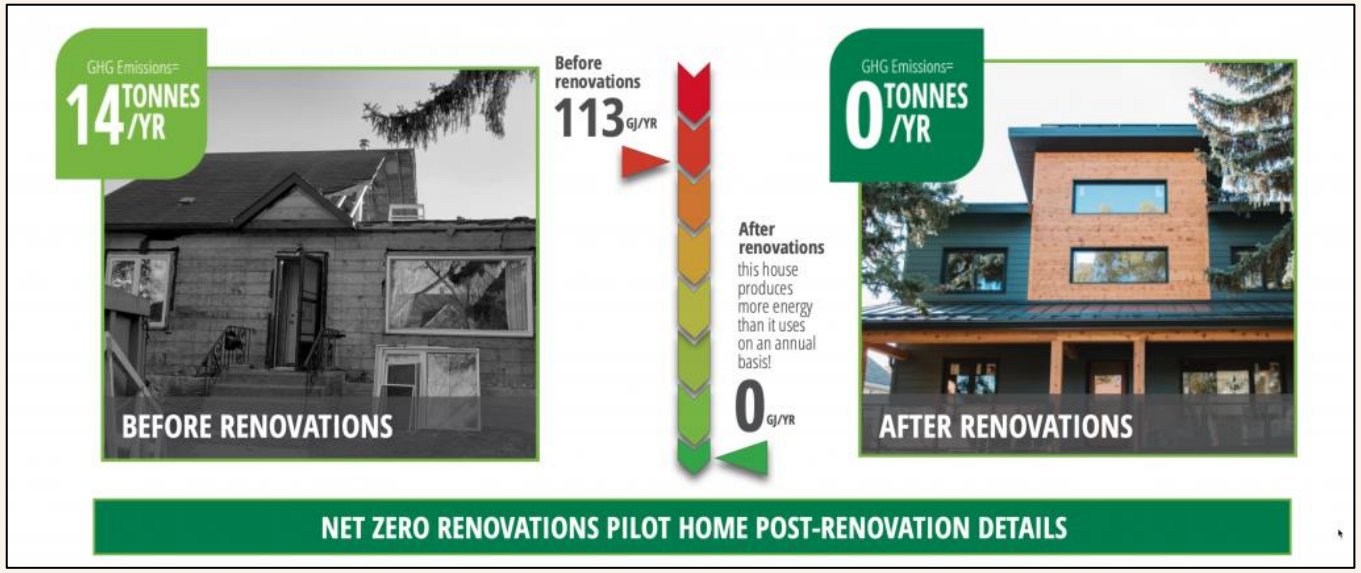

Image courtesy of the Canadian Home Builders' Association

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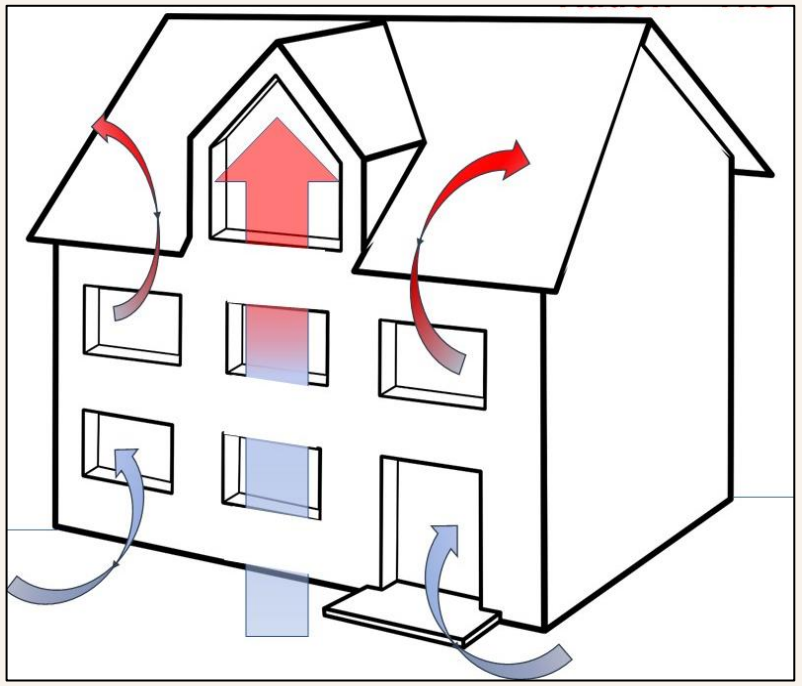

Radon

- Air pressure changes inside building because of:
  - Temperature
  - Wind
  - Mechanical effects
- Radon levels inside building envelope impacted **first by a source**, which is found in ground/soil beneath or beside the building where it contacts the ground.
- Next, radon levels impacted by the **amount of soil gas drawn inside the building** (negative pressure). This varies with:
  - Presence of openings between the building and ground
  - Amount of pressure differential that exists between the inside and outside.
- Soil saturation from rain and snow cover can increase levels

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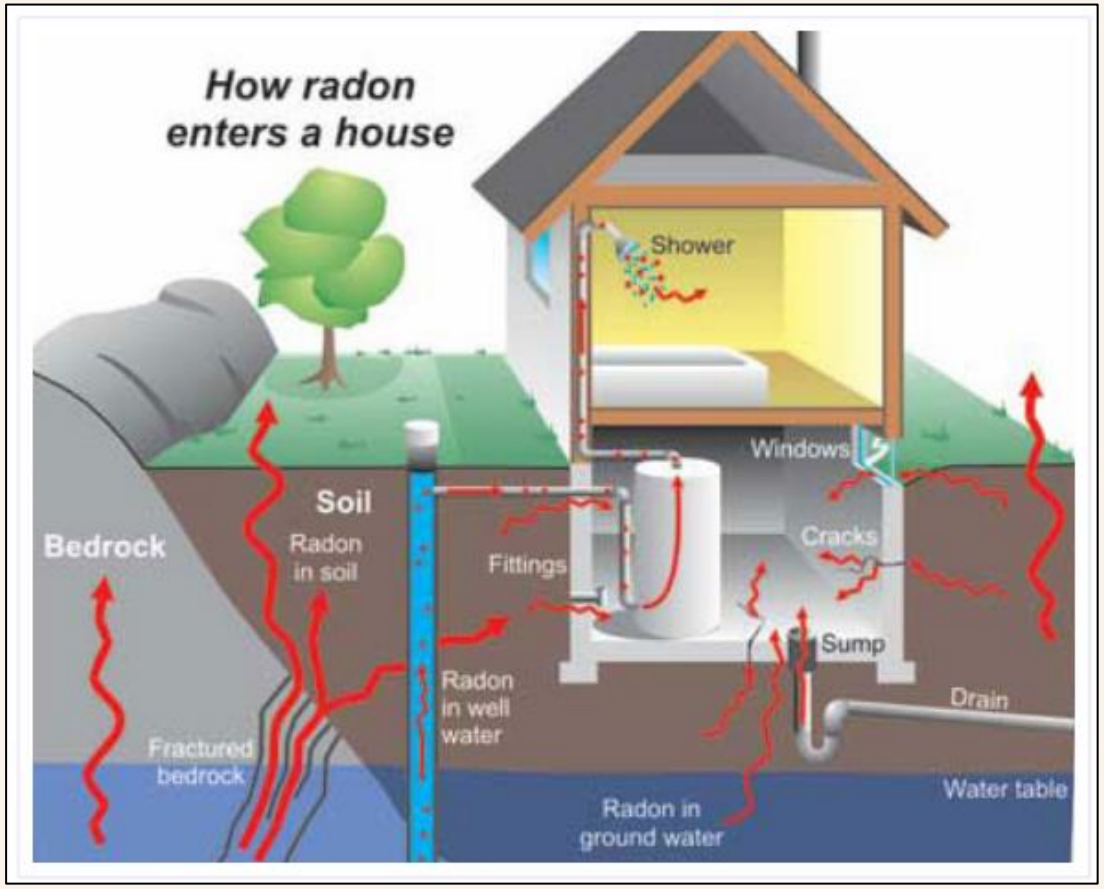

Health Canada, *Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors*

When air pressure inside a building becomes lower than in the soil surrounding the foundation, it draws in gases, including radon, through:

- construction joints
- gaps around service pipes
- support posts
- floor slabs
- floor drains, sumps
- cracks in the foundation
- walls and openings in concrete block walls

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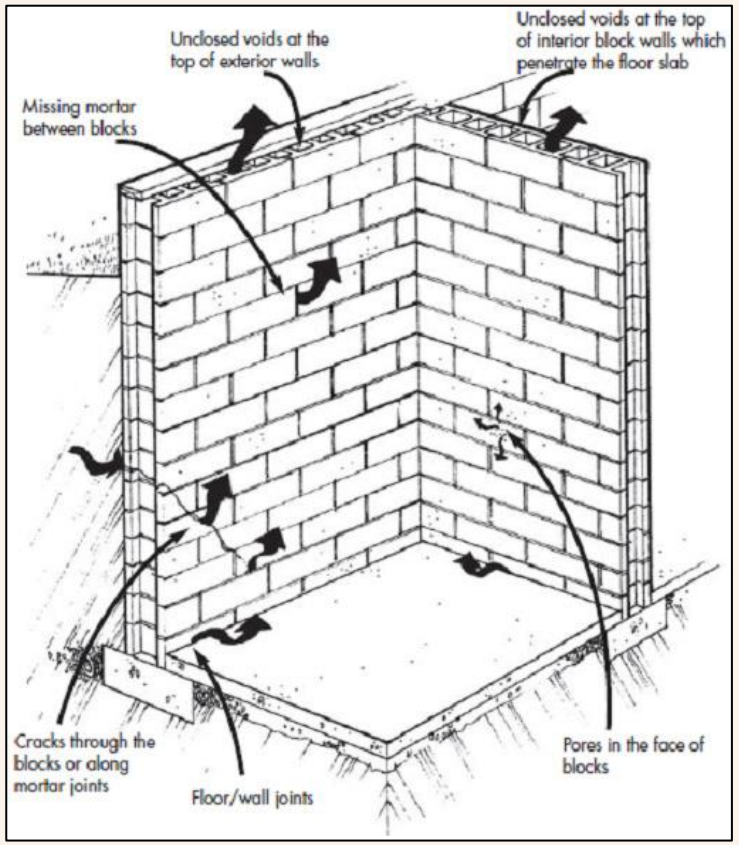
Radon - Reduction Guide for Canadians, Government of Canada

Radon - Reduction Guide for Canadians - Canada.ca

Middle image courtesy of Health Canada, *Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors*



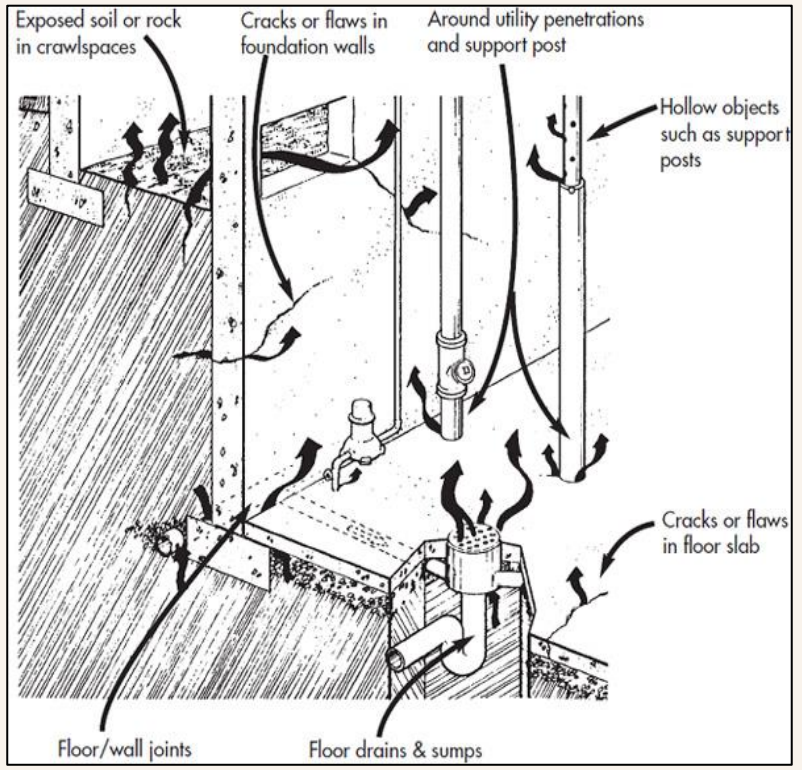


Figure 6 (above): Mainline backwater valve
(Source: ICLR)

https://newcanadiandrain.com/backwater-valve-installation-toronto/#prettyPhoto[coregallery]/3/

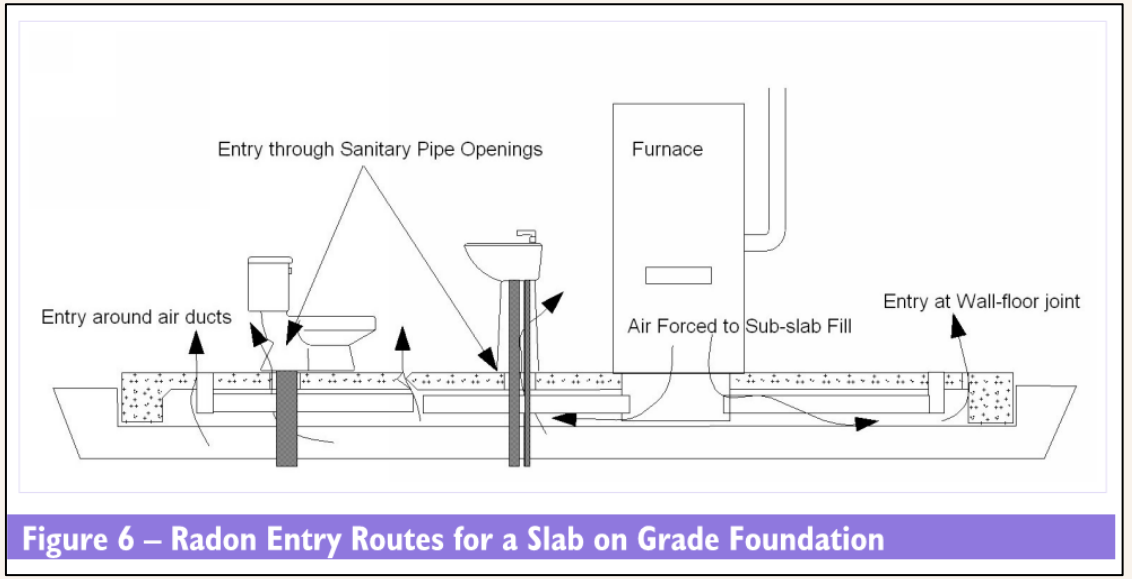
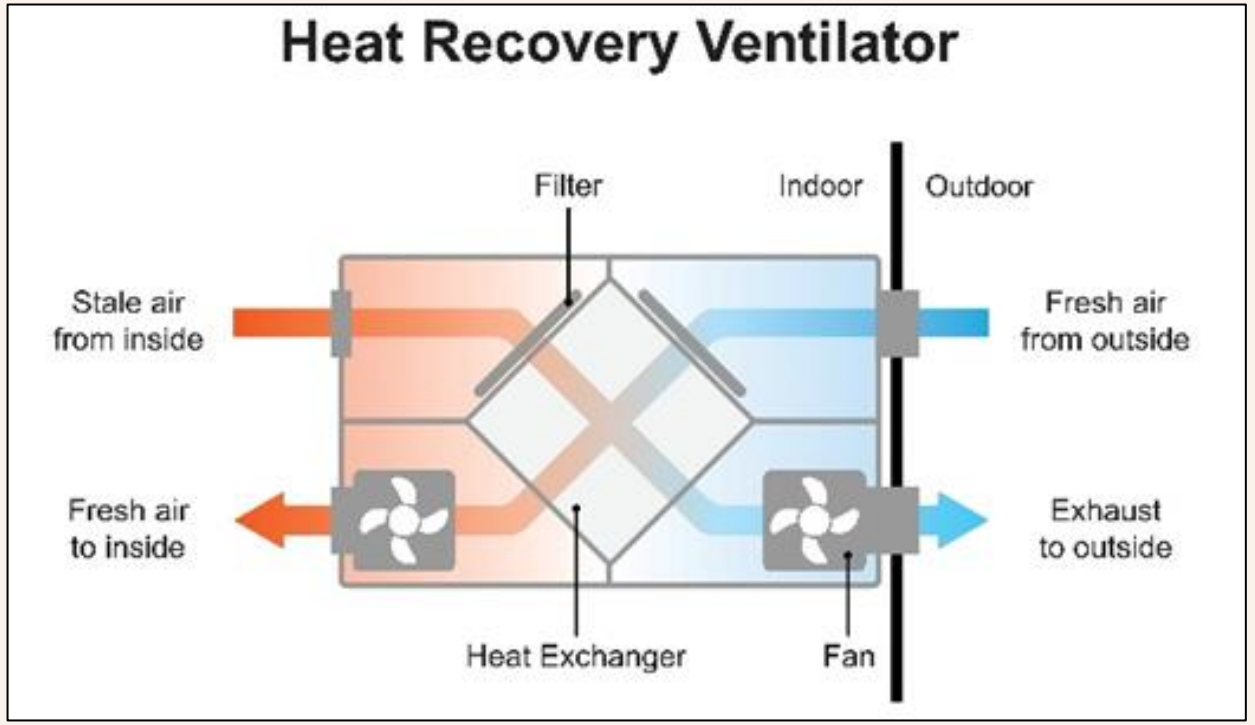


Figure 6 – Radon Entry Routes for a Slab on Grade Foundation

Ventilation and Radon

- HRV/ERVs must be balanced to function properly = same amount of air brought into the building as exhausted
- When out of balance, a positive or negative pressure can be created
- Exhaust fans can depressurize home
- These situations can be harmful
- **HRVs and ERVs may be out of balance** if improperly installed, if modifications were made to ducting or vents, or units aren't properly cleaned and maintained
- Regular filter cleaning is important for maintenance but often neglected



C-NRPP recommends all homes with an HRV/ERV use a digital radon monitor to continually measure indoor radon levels

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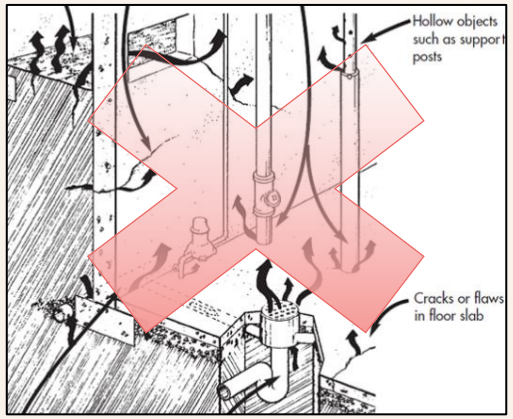
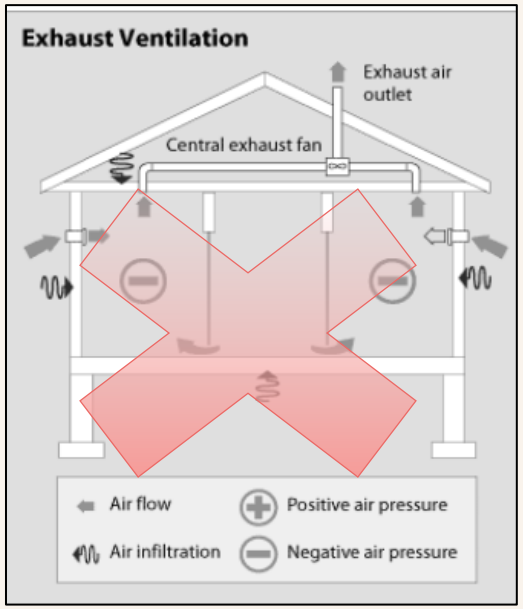
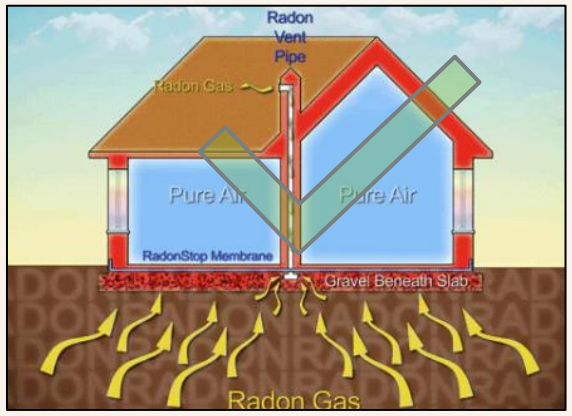
Summary

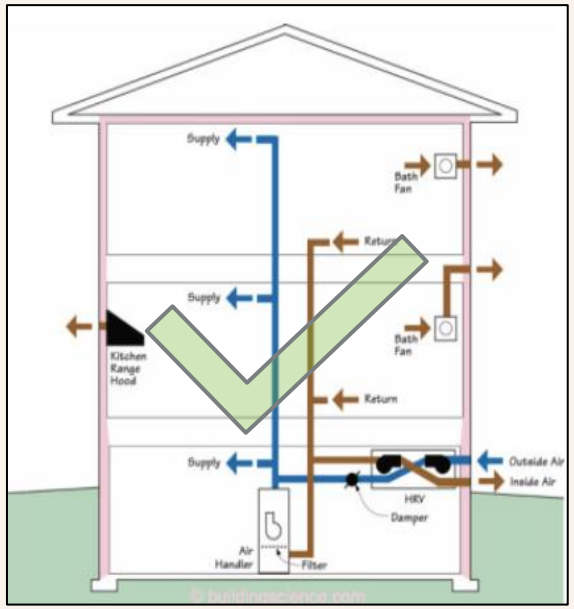
Don't Do This





Do This





- Continuous air barrier helps to **keep radon out**
- Balanced ventilation ensures **no negative pressure** which might increase radon levels
- Radon diffusion is a small part of the problem

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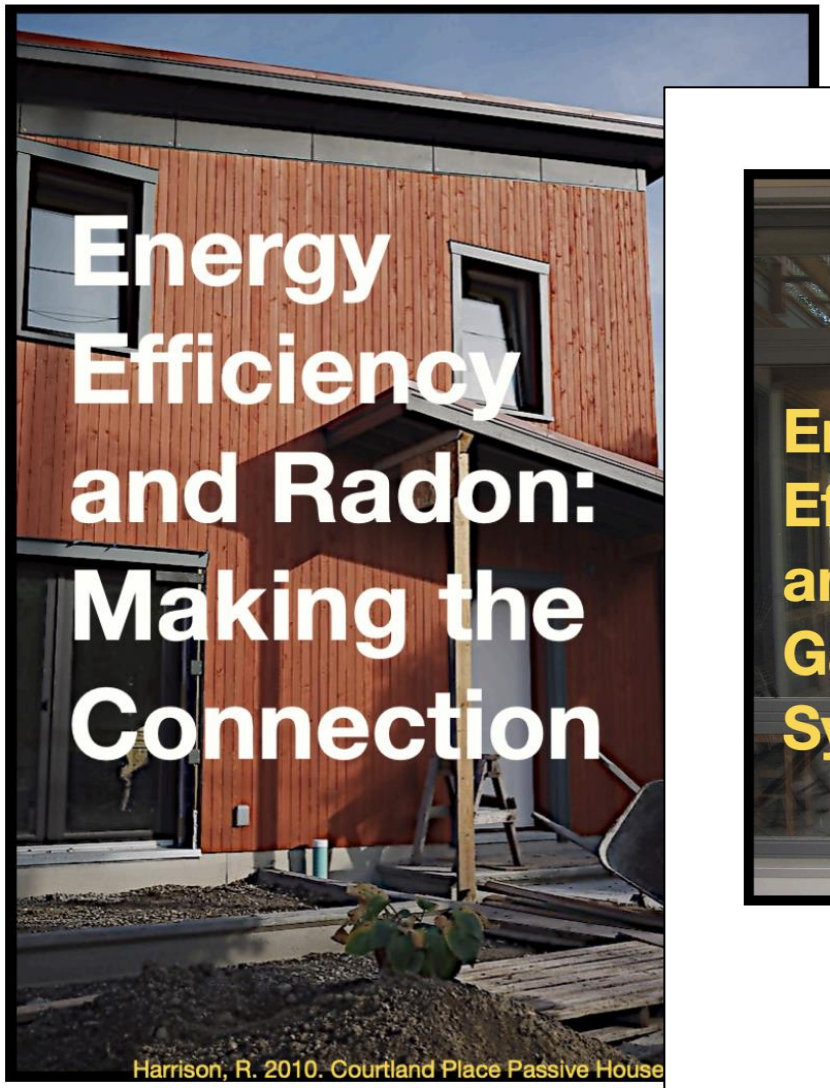
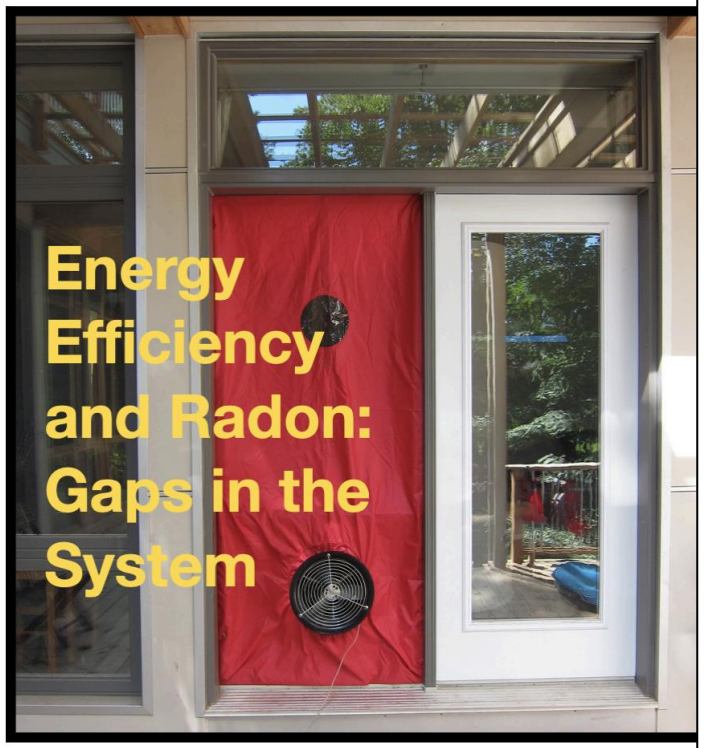


BC LUNG FOUNDATION



BC LUNG FOUNDATION

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https://bclung.ca/lung-health/radon/radon-and-energy-efficiency/

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What housing factors increase radon levels?

Activities that “seal up” homes

- More airtight double or triple glazed windows
- Air Sealing- Weatherstripping
- Continuous Insulation or Cavity Insulation with new Air Barrier

Increasing Air tightness influences gases

- Switzerland (Meyer et al 2019, Yang et al. 2020)
  - Radon levels ~2x in retrofitted homes ($p<0.05$)
  - Impacts of retrofits greater in high radon regions
- UK (Symonds 2019, Daraktchiev, 2021)
  - Double glazed windows- greatest impact on radon levels
  - The more EE options used, the higher the radon levels
  - Retrofitted homes have more measurement variation between rooms

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Great Review: Fisk WJ, Singer BC, Chan WR. **Association of residential energy efficiency retrofits with indoor environmental quality, comfort, and health**: A review of empirical data. Building and Environment. 2020 Aug 1;180:107067.

USA Weatherization Assistance Program Research

US Department of Energy (DOE) researched Weatherization Assistance Program (WAP)

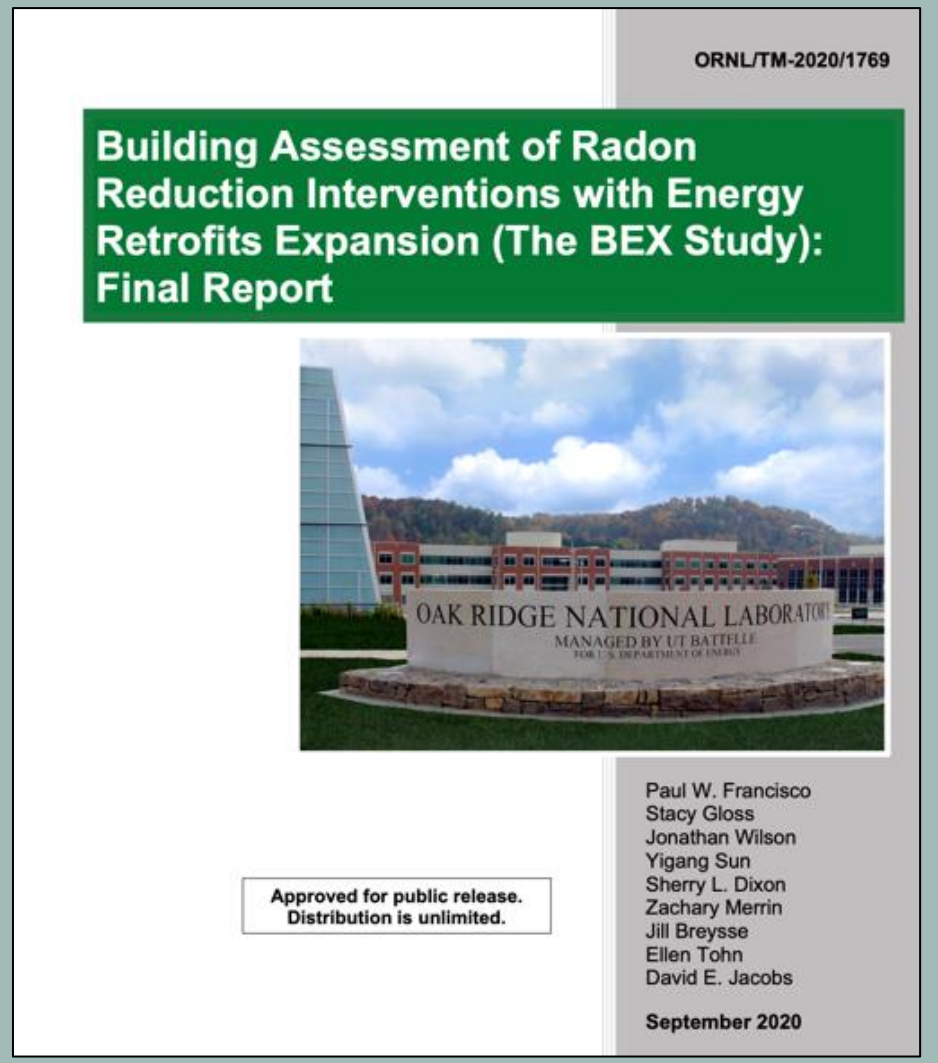
- Targeted at low-income housing
- Average energy cost reduction: $283.00
- Support local employment

Review of program (Pigg et al 2018, Francisco 2020)

- 514 homes across USA radon zones
  - Pre- and post- weatherization measurements
  - Control homes included
  - Short term (7-day) radon measurements

Results

- **Small but statistically significant impact on radon levels after weatherization (avg 0.44 pCi/L=16 Bq/m^3)**
- Greater impacts in higher radon regions



https://www.energy.gov/sites/default/files/2021/01/f82/WAP-fact-sheet_2021_0.pdf

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EPA United States Environmental Protection Agency

Search EPA.gov

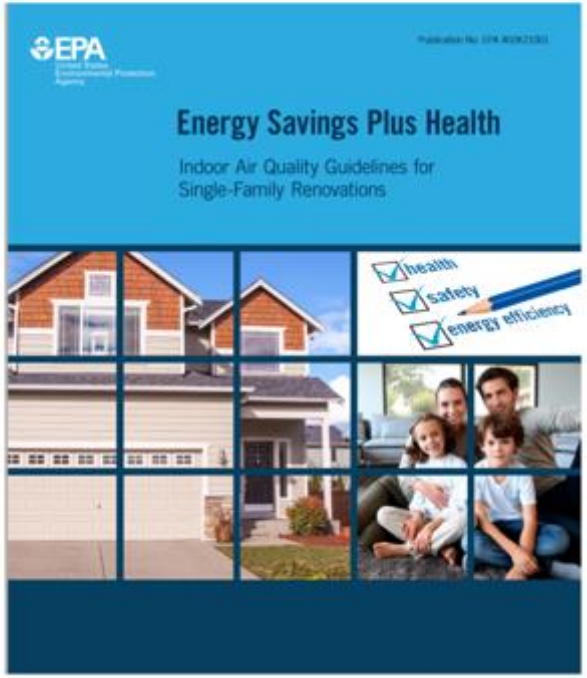
Environmental Topics | Laws & Regulations | Report a Violation | About EPA

Indoor Air Quality (IAQ)

CONTACT US

- Indoor Air Quality Home
- Learn about Indoor Air Quality
- IAQ by Building Type
- Network and Collaborate
- Popular IAQ Topics
- Frequently Asked Questions
- Publications
- Regional and State IAQ Information
- Webinars,Meetings & Updates

Energy Savings Plus Health: IAQ Guidelines for Single-Family Renovations



This page contains the EPA-developed Energy Savings Plus Health: IAQ Guidelines for Single-Family Renovations, a PDF guide that provides a set of best practices for improving indoor air quality in conjunction with energy upgrade work in homes.

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https://www.epa.gov/indoor-air-quality-iaq/energy-savings-plus-health-iaq-guidelines-single-family-renovations

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Testing Procedures

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- Indoor radon levels can change, even over a 24-hour period
- Several factors, e.g., building design, building condition, occupancy pattern influence radon levels
- Two houses, built side-by-side, can have different indoor radon levels
- Measurements gathered over 90 days provide better estimate of annual average exposure

NOTE: Testing should be done during the heating season.

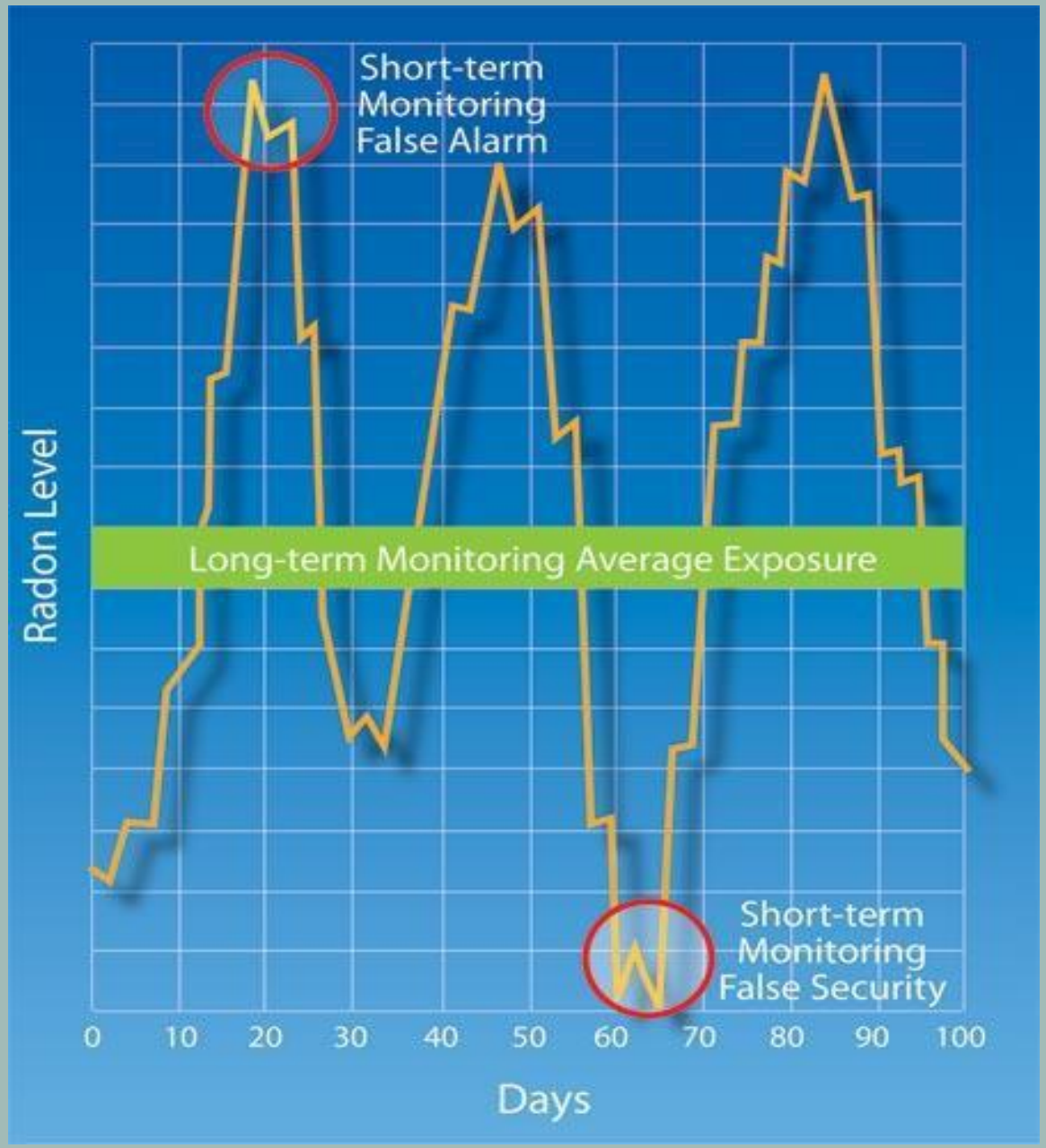

Image courtesy of CARST

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Radon Testing Devices

C-NRPP lists approved professional devices:

- Alpha Track devices
- Electret Ion (E-Perm)
- Continuous Radon Monitors

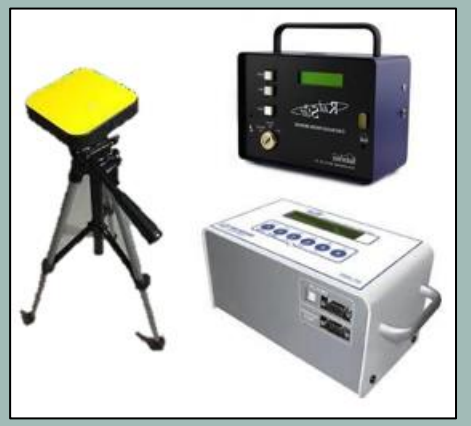
C-NRPP has developed Quality Assurance requirements to be used with radon measurements

Reference: https://c-nrpp.ca/approved-radon-measurement-devices

Alpha Track Devices

Electret Ion (E-Perm)

Continuous Radon Monitors



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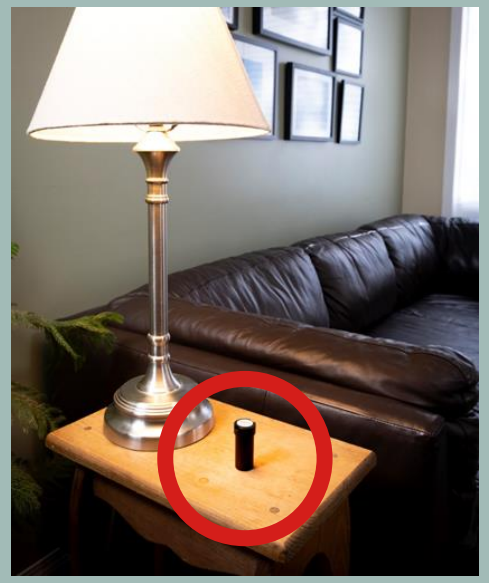
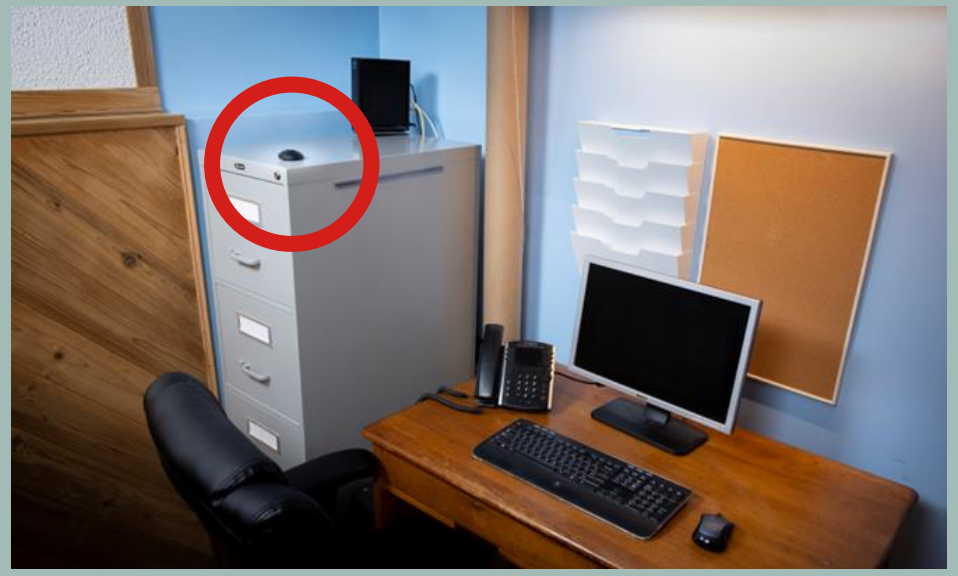
Detectors must be placed by homeowner or measurement professionals per Health Canada placement guidelines in occupied rooms

https://www.canada.ca/en/health-canada/services/publications/health-risks-safety/guide-radon-measurements-residential-dwellings.html





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Consumer-Grade Electronic Radon Monitors

There are digital radon monitors for homeowner testing:

- Can't be calibrated

Journal of Radiological Protection

PAPER • OPEN ACCESS

A comparison of consumer-grade electronic radon monitors

Pam Warkentin[1], Erin Curry[2], Oghenekome Michael[1] and Brian Bjorndal[3]

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Journal of Radiological Protection, Volume 40, Number 4

Citation Pam Warkentin *et al* 2020 *J. Radiol. Prot.* **40** 1258

Article PDF

Article: https://iopscience.iop.org/article/10.1088/1361-6498/ab96d6

Library Detector Programs: https://takeactiononradon.ca/resources/lending-programs/

Purchase Radon Test Kits: https://takeactiononradon.ca/test-for-radon/radon-test-kits/#buykit

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The following devices are not recommended by C-NRPP

Air Steward		Check out the recall at: **Air Steward:** https://recalls-rappels.canada.ca/en/alert-recall/air-steward-portable-radon-monitor-recalled-due-inaccurate-radon-detection
Radon Guard		Check out the recall at: **Radon Guard Monitor** https://recalls-rappels.canada.ca/en/alert-recall/health-canada-warns-elifecity-portable-radon-meter-may-post-health-and-safety-risk-0

https://c-nrpp.ca/wp-content/uploads/2023/10/Digital-Device-Report-Oct-2023.pdf

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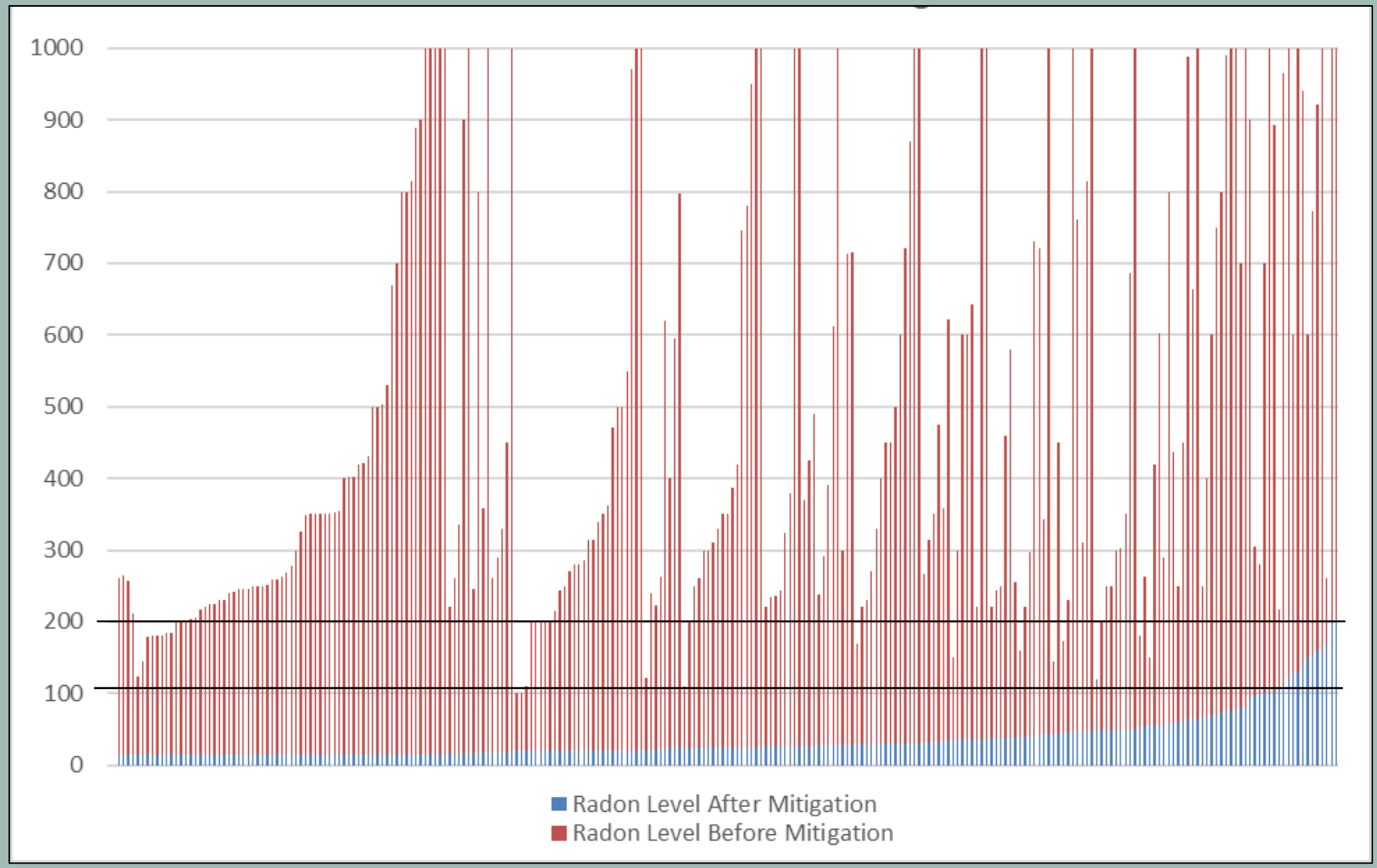
Canadian National Radon Proficiency Program

2023 Intercomparison Report

		Manufacturers stated Accuracy	Frequency of Reading	Digital Display or cell-phone app	Battery or Plug-in	Passed C-NRPP Performance Test For more details click here.
	Airthings Corentium Home	±10% (after 7 days at 200 Bq/m³), ±5% after 2 months of monitoring	12 hours 24 hours 7 days (first reading will take 24 hrs)	Short-term and long-term average shown on monitor display.	Battery	✓
	Airthings Wave Plus	±10% (after 7 days at 200 Bq/m³), ±5% after 2 months of monitoring	Hourly	Long-term average shown on cell phone app. Color-coded indication of levels on monitor.	Battery	✓
	Airthings View Plus	After 30 days at 200 Bq/m³, ±10% on the 7 day average and +/- 5% on the 2 month average	Hourly	Short-term average shown on monitor display; long-term average shown on app.	Battery or plug in (USB-C)	✓
	EcoSense EcoQube	+/-10% at 370 Bq/m³ after 10 hours	Measures every 10 minutes and displays an hourly rolling average.	Hourly level shown on display, long term average available on the app.	Plug in	✓
	EcoSense EcoQube Blue	+/-14% at 370Bq/m³	10 mins	Device displays 1 hour, 1 day, 1 week and 1 month rolling averages.	Plug in	✓
	EcoSense Radon Eye RD200	±10% at 370 Bq/m³ after 10 hours	10 mins	Displays 1 hour rolling average; long-term display on app.	Plug-in	✓
	SunRadon Luft	±10% (after 7 days at 200 Bq/m³)	Initial reading takes 90 mins, hourly.	Long-term and short-term averages shown on the app. Color coded indication of levels on monitor display.	Plug-in	✓

info@c-nrpp.ca www.c-nrpp.ca

Radon Levels BEFORE and AFTER Mitigation



https://takeactiononradon.ca/radon-reduction-sweepstakes-report-2018-2019

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200 Bq/m³ = Canada's Guideline

100 Bq/m³ = World Health Organization (WHO) Guideline

Radon Prevention and Barrier Systems

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Owens Corning FOAMULAR® RadonBARRIER™

Considers basement building science – addressing occupant comfort, indoor air quality, and safety.

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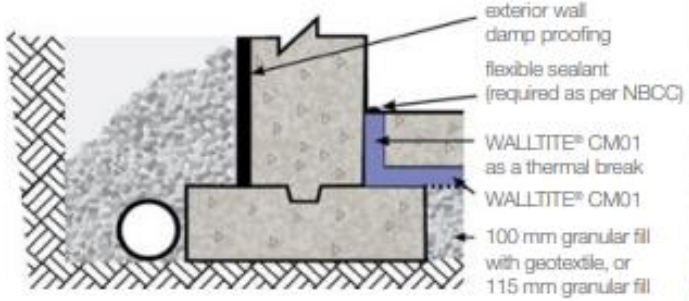
Radon Control with Walltite

https://walltite.basf.ca/pdf/Protecting%20Homes%20from%20Radon%20-%20Brochure.pdf

TYPICAL BASEMENT FLOOR TO FOUNDATION WALL JUNCTION COMPLYING WITH BUILDING CODE SEALING REQUIREMENTS



WALLTITE® CM01 sprayed directly on gravel for under slab

WALLTITE® CM01, when used as a soil gas (radon) barrier has been evaluated by CCMC to comply with:

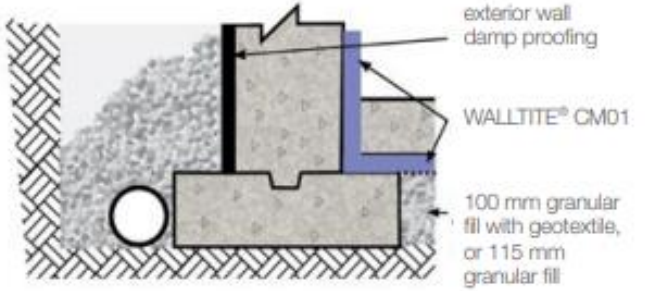
Sentence 9.13.4.2.(1), Protection from Soil Gas Ingress (air barrier system for floor assemblies) and as an alternative solution to:

Sentence 9.25.3.6.(1), Air Barrier Systems in Floors-on- ground (6-mil polyethylene)

Sealing the joint between the foundation wall and slab with a flexible sealant provides additional control of air leakage to satisfy the requirements of Sentence 9.25.3.6(5).

For more information refer to CCMC 14152-R

ALTERNATIVE BASEMENT FLOOR TO FOUNDATION WALL JUNCTION



WALLTITE® CM01 applied on basement walls and under slab

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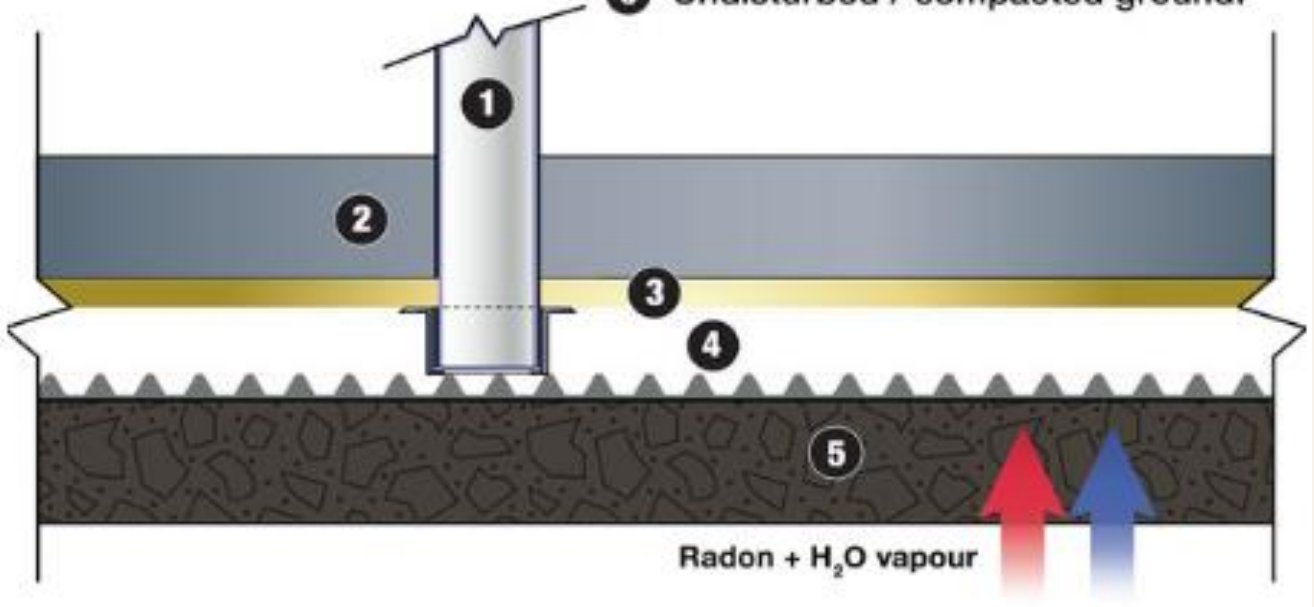
RADONBLOCK™

RADON GUARD™

STRUCTURAL UNDER-SLAB VENTILATION

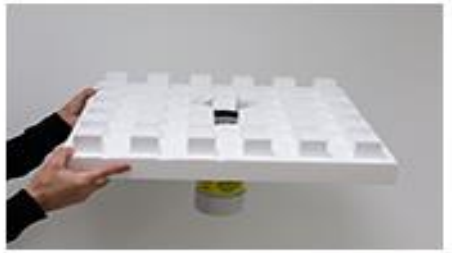
1. 4" radon pipe under slab; capped, labelled, and venting to exterior.
2. Poured concrete floor slab.
3. Radon Block™ polyethylene membrane.
4. Radon Guard™ structural under-slab ventilation + insulation panel.
5. Undisturbed / compacted ground.



PERFORMANCE VS PRESCRIPTIVE SOLUTIONS

Residential

Commercial



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Sumps

- Prefabricated sump covers come with holes precut
- Sump covers can be made from PVC or polycarbonate plastic
- Lid seals can be purchased separately
- For new construction, must have air-tight sealed cover installed

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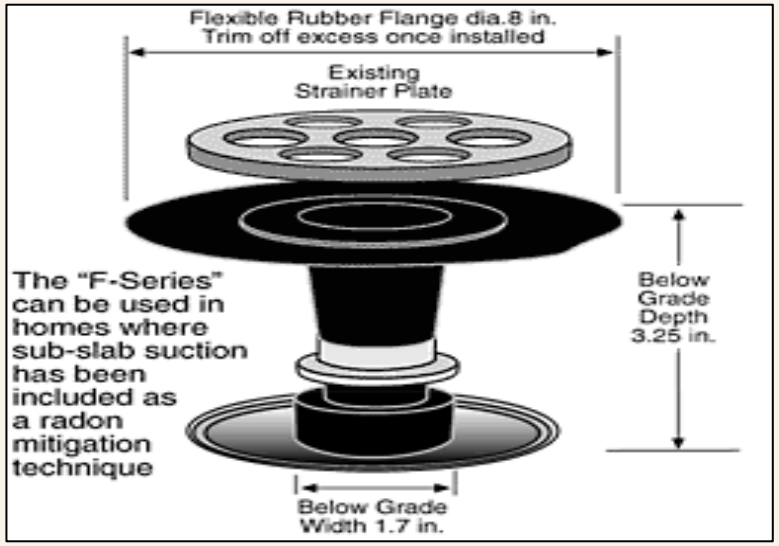
Radon Equipment and Floor Drains



http://www.radondetect.ca/ Radon Detect Inc. Canada's On-line Radon Store

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Moisture/Air Barriers

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Soil-Gas Retarder

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Reducing Radon (Mitigation)

Pam Warkentin

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Radon Mitigation Systems

Passive System

- Installation easier with new construction
- Needs more design and planning

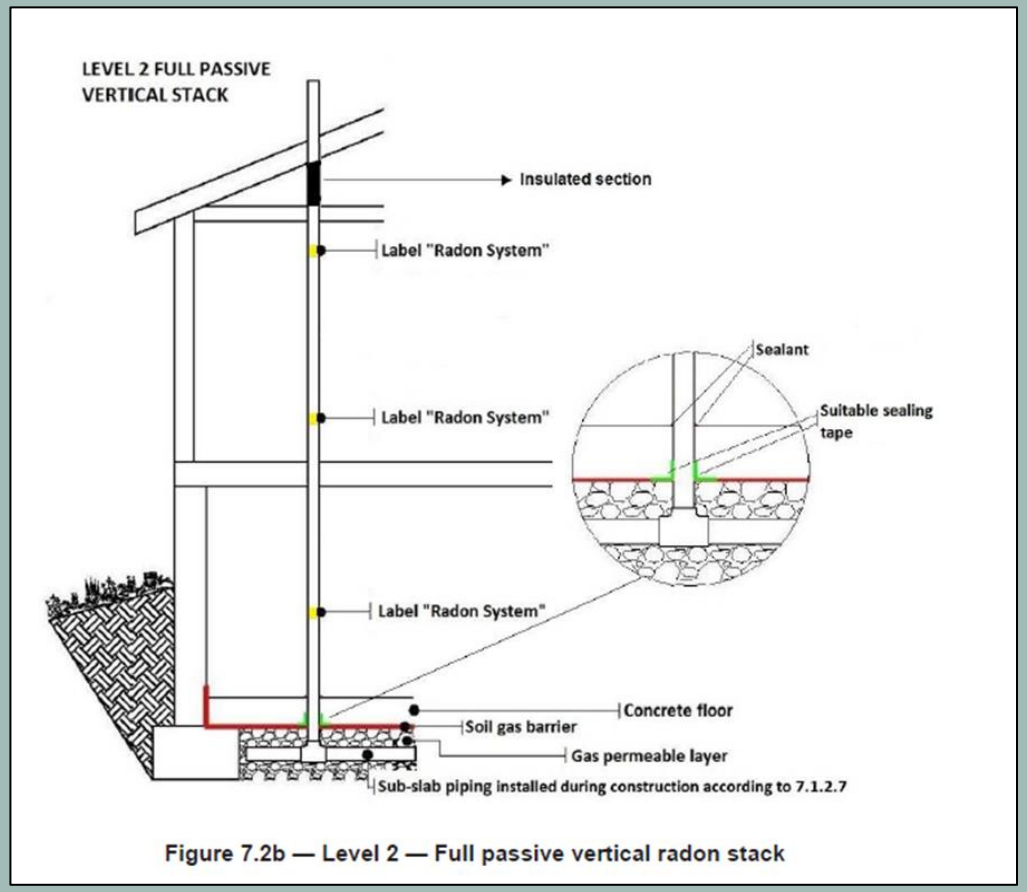
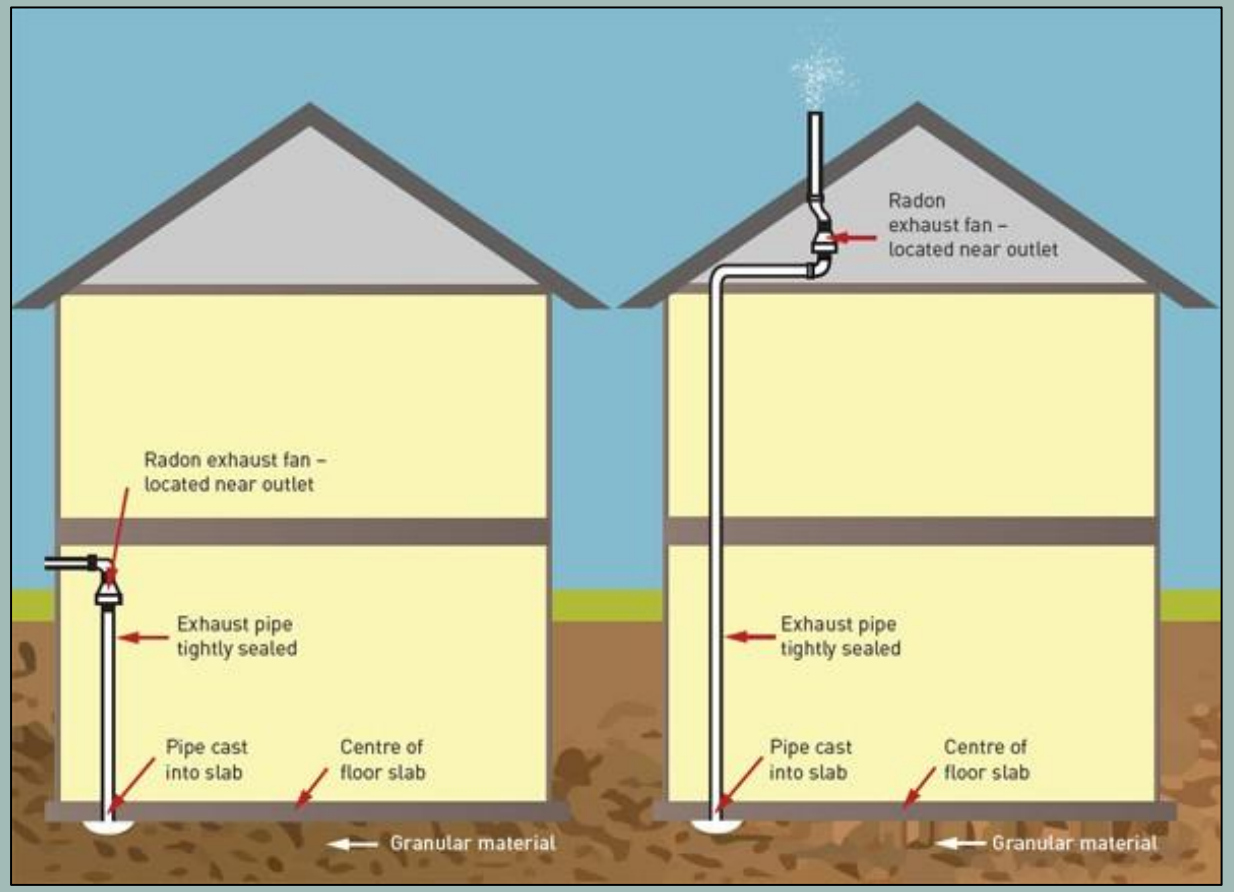


Figure 7.2b — Level 2 — Full passive vertical radon stack

Active System

- Installation easier with existing homes especially side wall vented



https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/radon-reduction-guide-canadians-health-canada.html

- Sub-slab depressurization systems reduce radon levels by an average of over 90%
- Cost ranges depending on the complexity of the house
- Cost can range from: $3,000 and up
- Generally installed in one day
- Most effective when installed by C-NRPP Radon Mitigation Professional

Photos courtesy of C-CRPP and CARST

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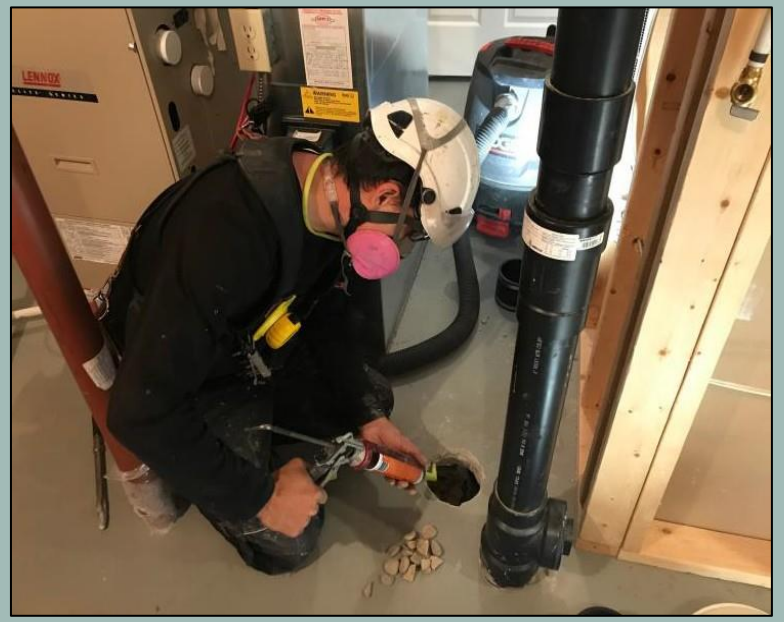
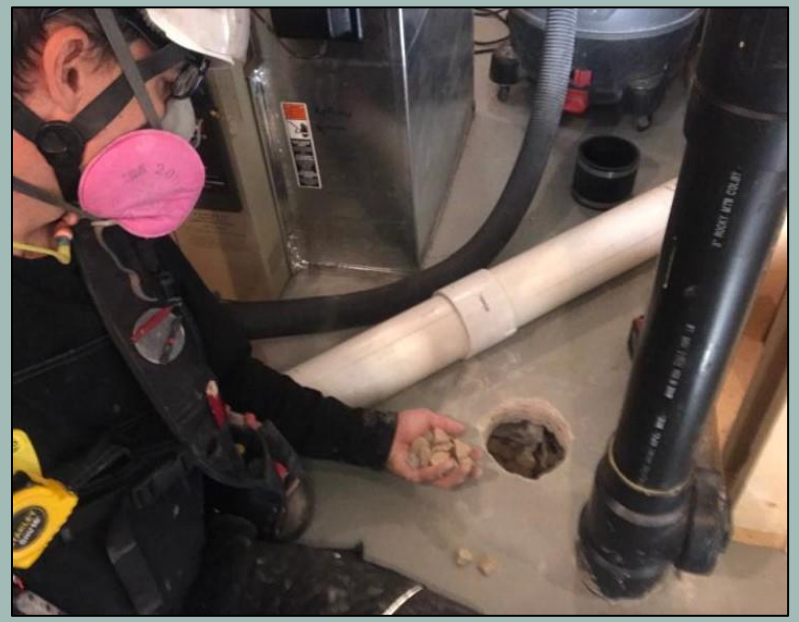
Radon professional must do communication testing





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Photos courtesy of C-CRPP and CARST

A system can be installed in an ‘out-of-the-way' place, e.g. furnace room

Photos courtesy of C-CRPP and CARST

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CAN/CGSB -149.11-2024 Radon Control Options for New Buildings

Level 1 **Radon rough-in system for active soil depressurization – (CAN/CGSB-149.11)** – requirement for a passive stack (Level 2) or active system (Level 3). Level 1 systems include a gas permeable layer, soil gas barrier and soil gas collector. The barrier reduces the convection and diffusion of radon from the ground into the building. The soil gas collector is connected to a solid pipe that is accessible above the finished floor. There are two options for the installation of a Level 1 system based on the termination of this pipe, either Level 1a, where the pipe is capped and sealed within the building (typically above the floor of the lowest level), or Level 1b, in which the pipe extends outside through a rim-joist or sidewall where it is capped. The authority having jurisdiction may already require a Level 1a system for future radon mitigation in a building.

Level 2 **Passive vertical radon stack (includes Level 1a plus a stack) – (CAN/CGSB-149.11)** – requirement for an active system (Level 3), includes Level 1. Level 2 features a stack which runs vertically up through the building and exhausts above the roofline. The system reduces indoor radon gas infiltration into the building through passive soil depressurization due to the stack effect. This does not require electrical power. Research has demonstrated that Level 2 systems have reduced indoor radon gas concentrations by 40 to 90%[2-8]. The authority having jurisdiction may already require a full passive vertical radon stack for radon mitigation in a building.

Level 3 **Full active soil depressurization system (includes Levels 1a and 2 plus an ASD fan or Level 1b plus an ASD fan) – (CAN/CGSB-149.12)** – includes Level 2 or Level 1b. This is the most effective radon control system, requiring an ASD fan to operate continuously to provide active soil depressurization. A reduction of the indoor radon concentration of approximately 90% or more (in the case of high indoor radon gas concentrations) can be obtained by installing a properly implemented Level 3 [full active (ASD fan driven)] radon control system. Level 1b and Level 2 systems as described in this standard can be upgraded to a Level 3 system by the addition of an ASD fan as outlined in CAN/CGSB-149.12.

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CAN/CGSB 149.11 - Level 1b and 1a: Radon Rough-In System

Figure 3 – Illustrative diagram of a Level 1b radon rough-in system and its three components

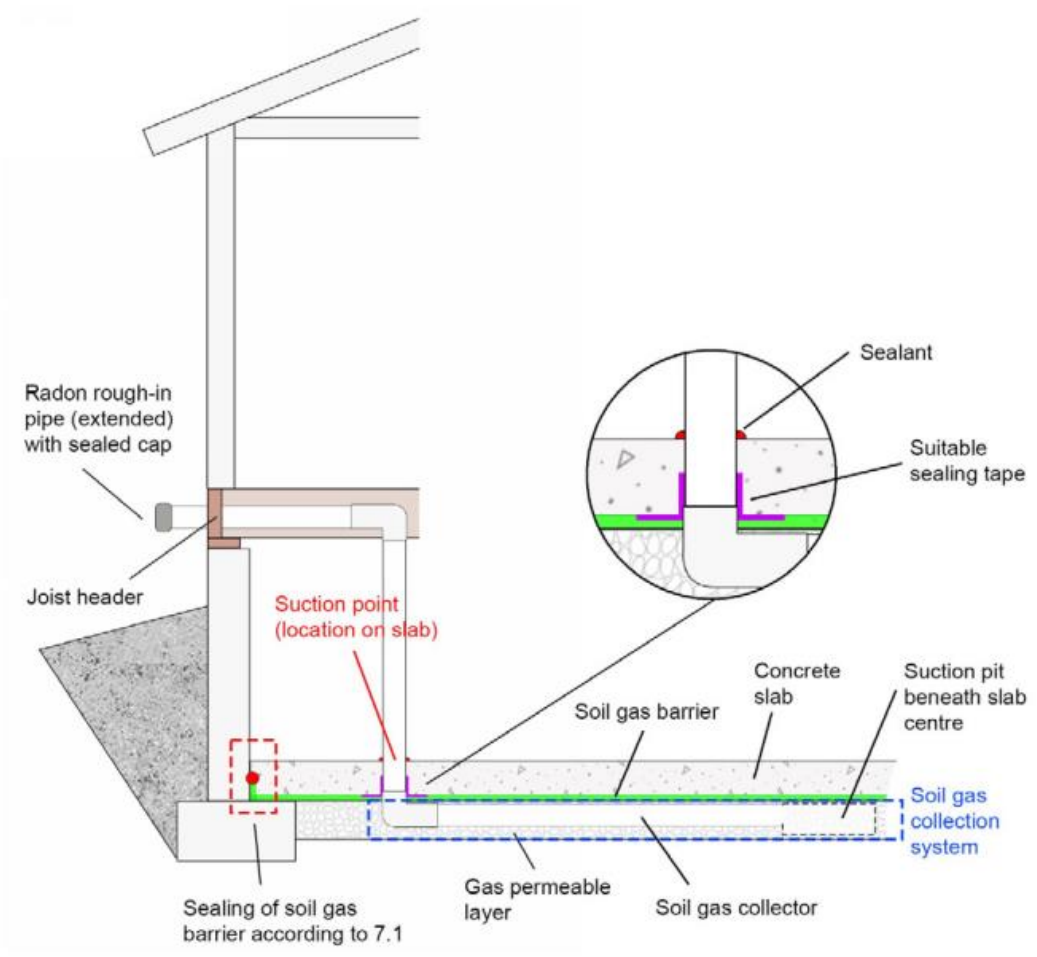
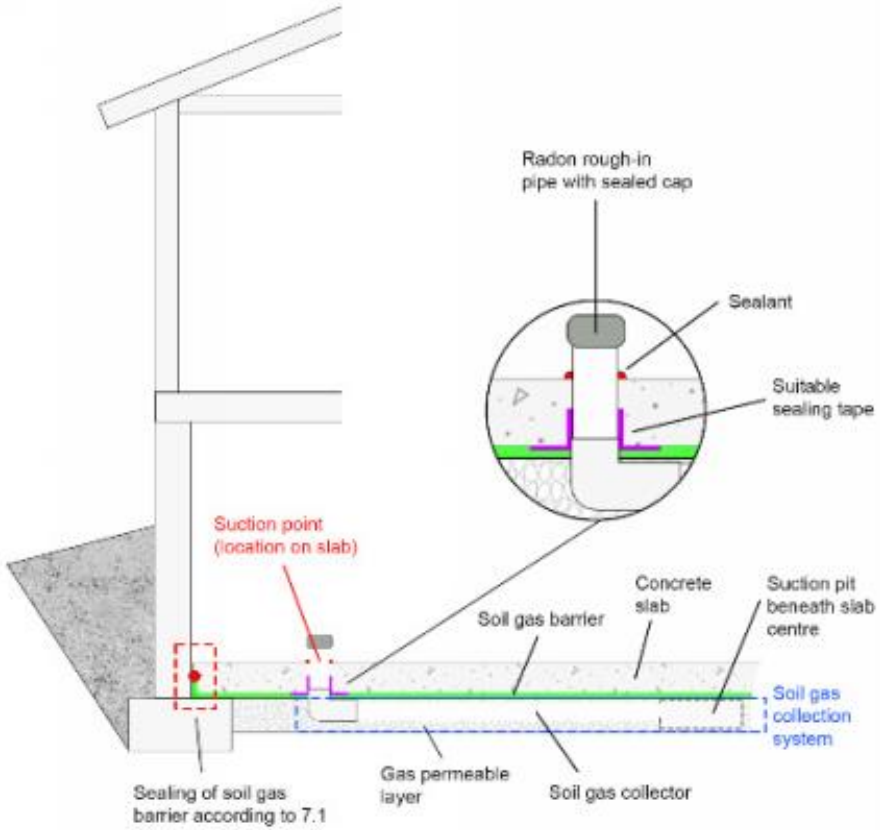


Figure 2a – Illustrative diagram of a Level 1a radon rough-in system and its three components



+ Fan = Active System

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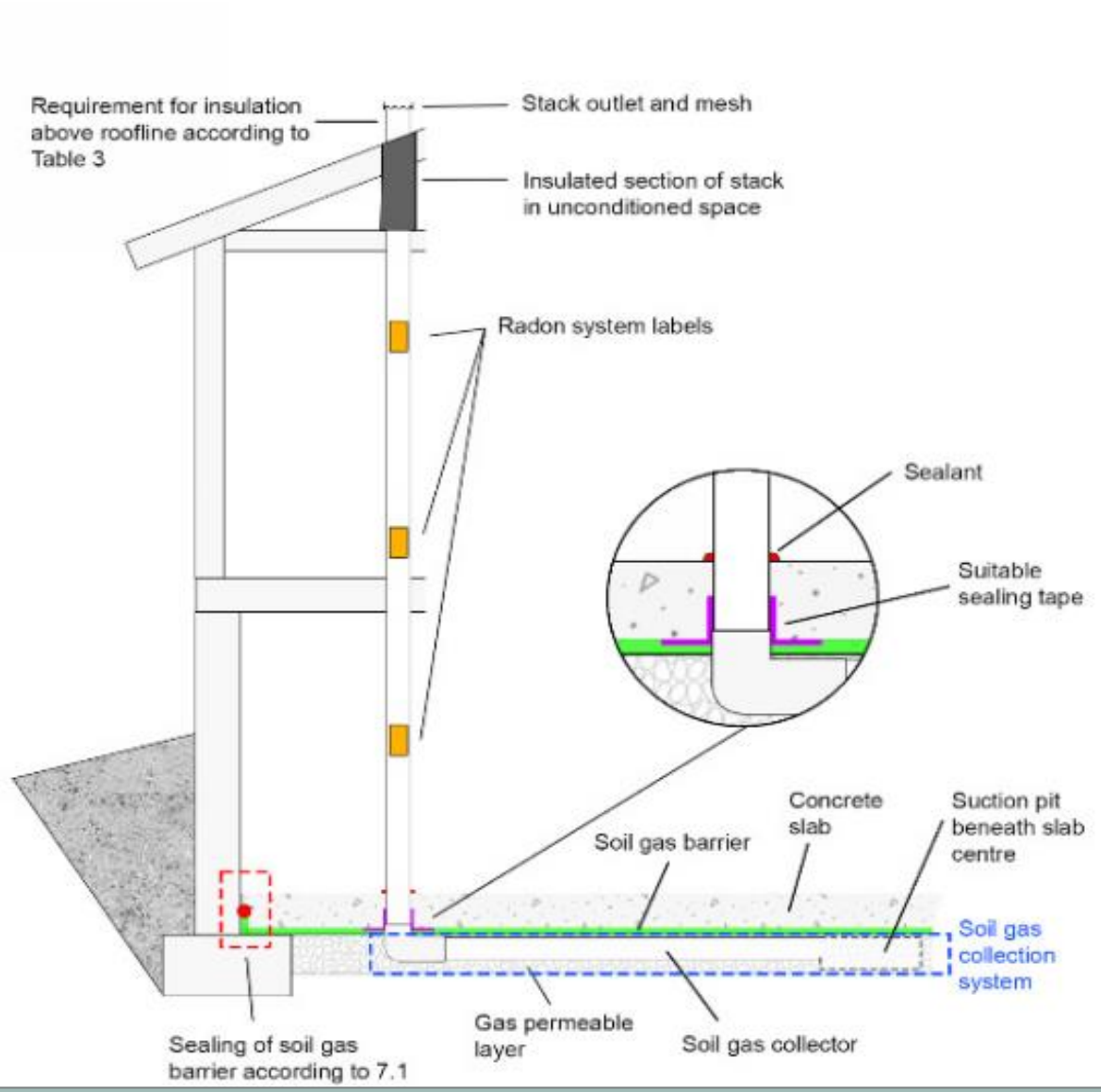
CAN/CGSB 149.11 – Level 2: Passive System Vertical Stack

Figure 10 – Level 2 system – Illustrative example of a passive vertical radon stack (not to scale)



\+ Fan = Active System

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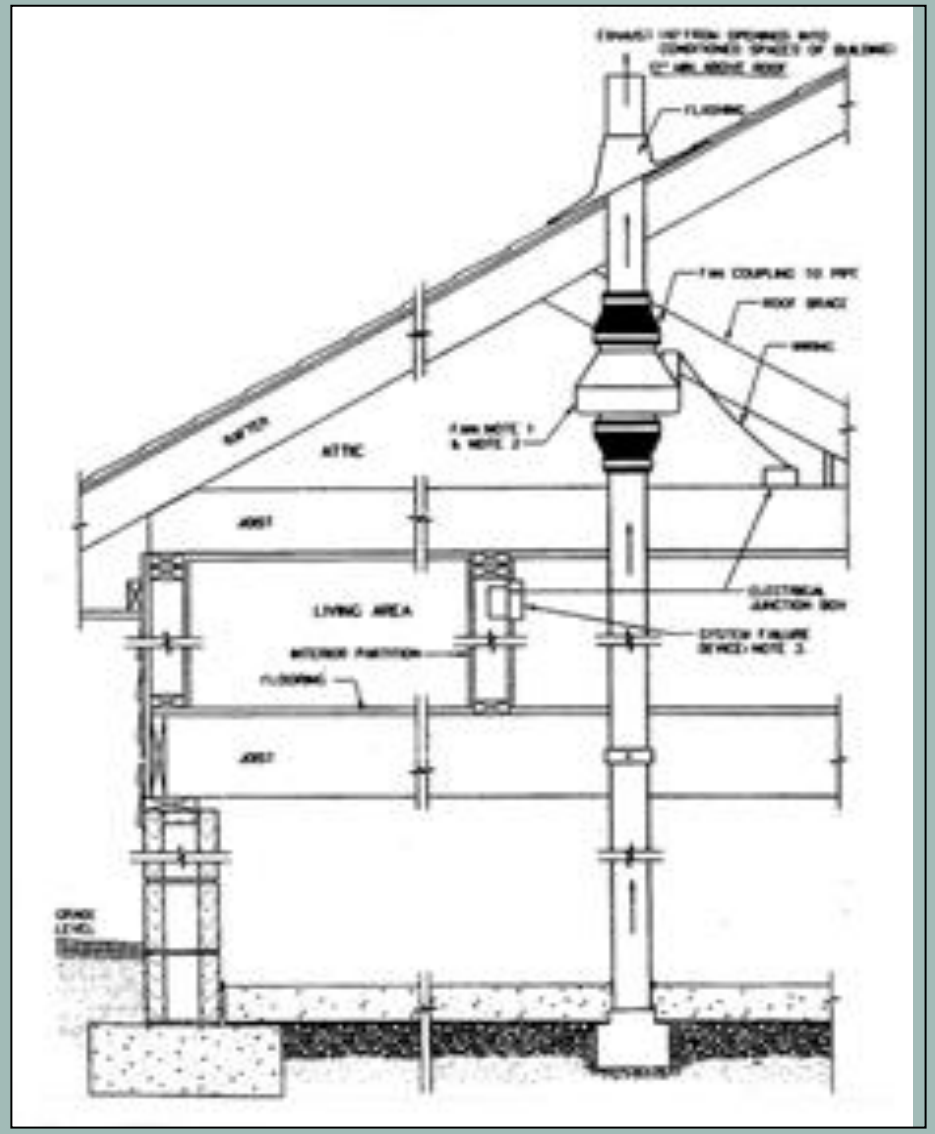
CAN/CGSB 149.11 – Level 3: Active Radon Reductive System (ASD – Active Soil Depressurization)

- AKA Sub Slab Depressurization
- Active system with fan in attic or basement installation
- **Note:** Pipe should be far enough away from eave to permit installation of fan and electrical



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Photos courtesy of C-CRPP and CARST

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Photos courtesy of C-CRPP and CARST

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Questions to ask a Mitigation Professional

- Do you have insurance?
- What steps/tests will you complete before installing radon mitigation system?
- What areas will be sealed?
- How do you decide which fan to use?
- What clearances will follow for the discharge?

Things to look for in well-installed mitigation system

- Did they seal around the openings in the foundation?
- Did they follow proper discharge clearances?
- Is it properly labeled (DO NOT UNPLUG)?
- Did they provide leave behind information?

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Building Code Requirements

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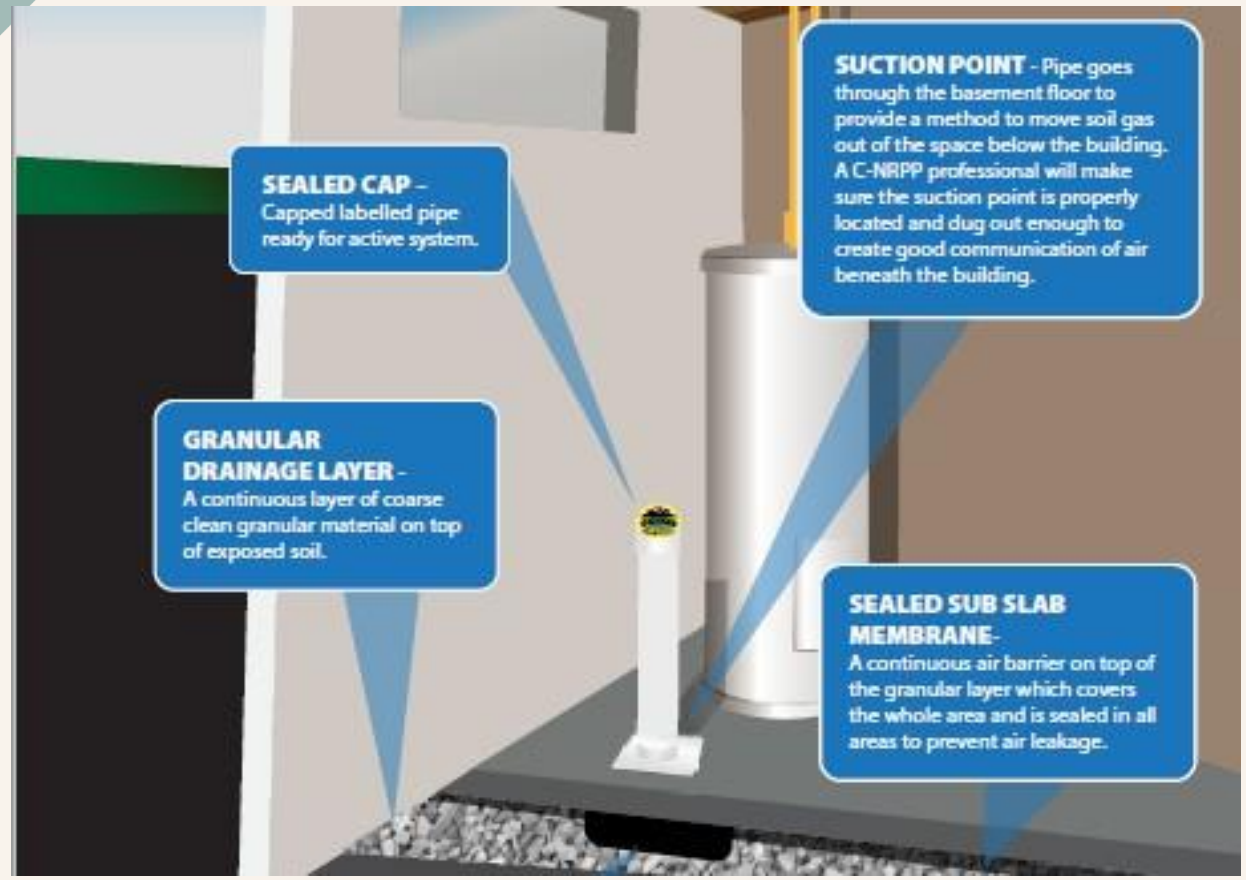
National Building Code



NBC applies to all provinces and territories, except BC. ON must meet NBC by Jan 1, 2025.

NBC 9.13.4. - Soil Gas Control

- Course clean granular material under slab
  - No less than 4” layer
  - Less than 10% fines
  - Void area content 35-40% (ASTM E1465)
- Well-sealed sub-slab membrane
  - Continuous barrier
  - Sealed in all areas to prevent air leakage
  - Including sealed floor to wall joint
- Sealed Sump Pit
  - Sealed with an airtight lid
- Radon rough-in for future installation
  - Ideally minimum 12” above floor
  - Sealed, capped and labeled in above floor section
  - In location for future installation of mitigation system

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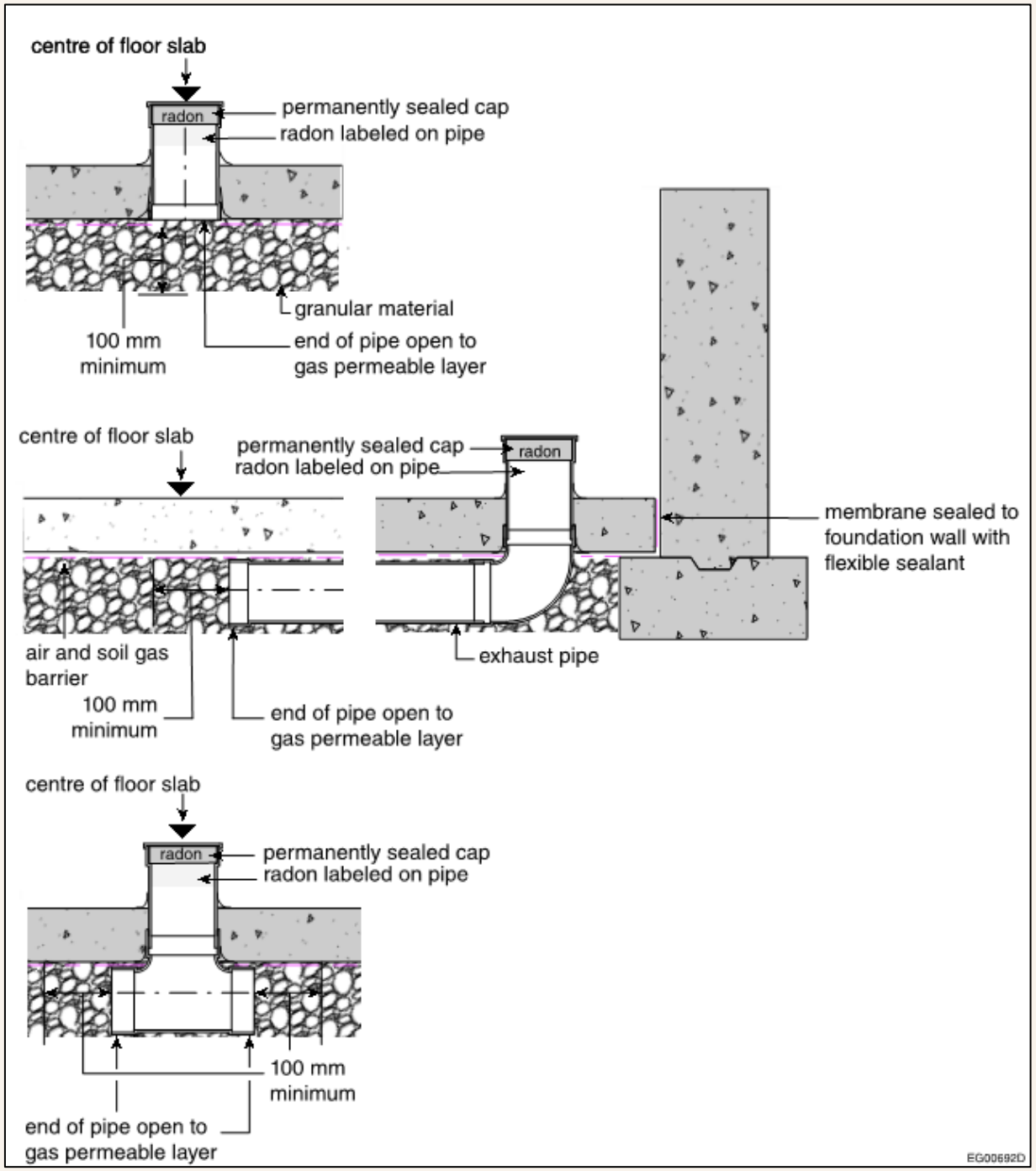
Refer to:

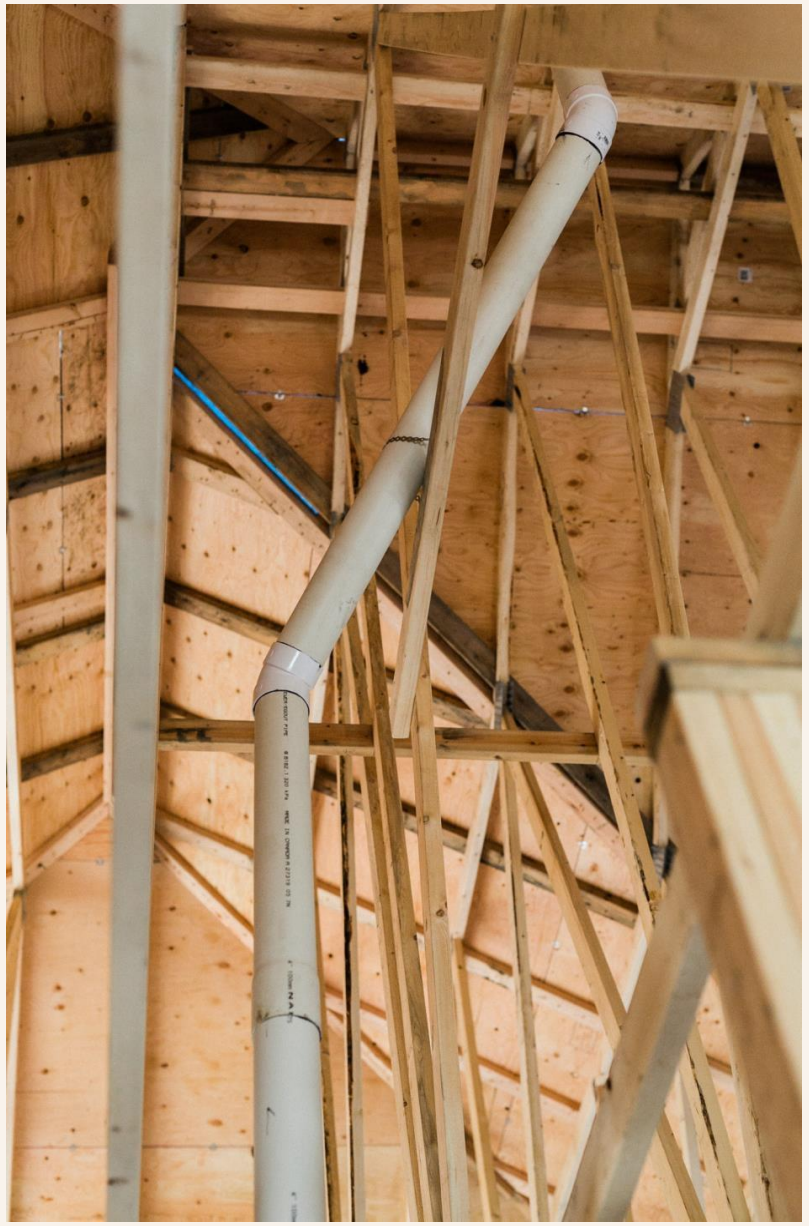
Appendix Note A-9.13.4.3.(2)(b) and (3)(b)(I) Effective Depressurization

- Acceptable configurations for extraction opening in a depressurization system



Current BC Building Code

- Includes a CAN/CGSB 149,11 Level 2 installation
- Includes all measures from National Building Code
- **BUT** radon pipe must exit building envelope



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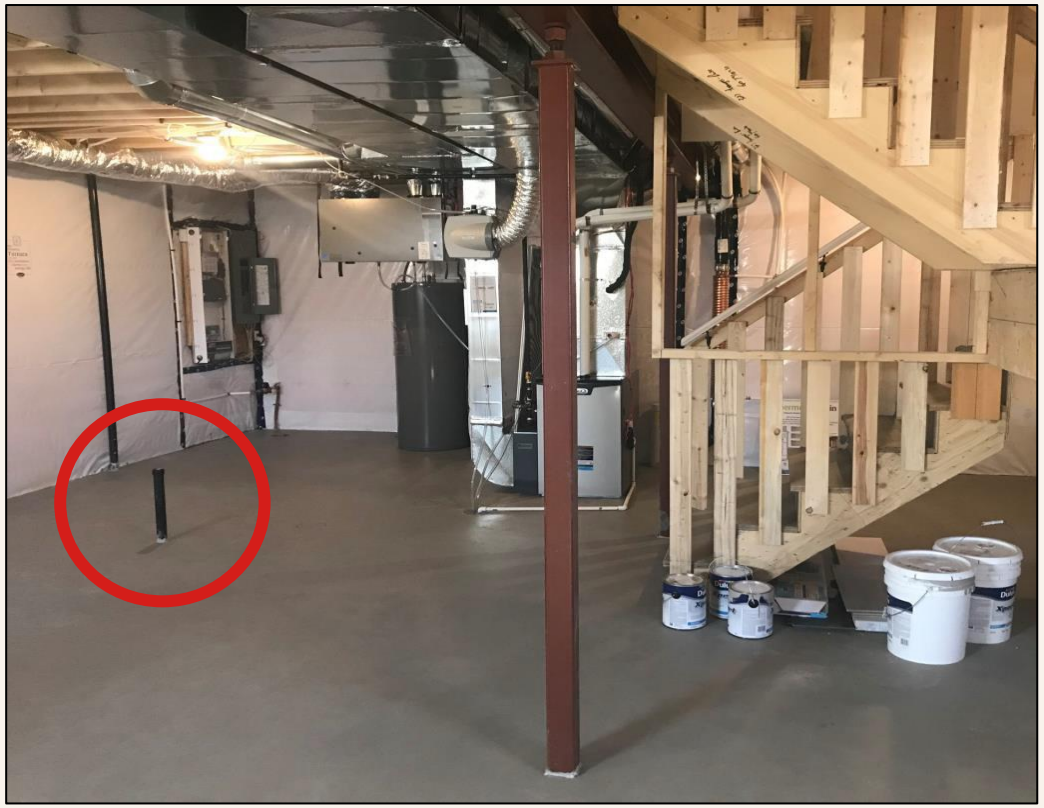
Radon Rough-in



Radon rough-in pipe is meant to extend to the outside with a fan, if required.

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What's Coming in the Future?

- Proposed change (PCF 1713) for NBC 2025 (Adoption ~2027)
- Requires all new homes to have passive stack installed

1713	Passive Vertical Radon Stack	This proposed change adds requirements for radon mitigation by use of a passive vertical radon stack in dwelling	NBC20 Div.B 9.13.4.

https://codes.nrc-cnrc.gc.ca/en/certifications-evaluations-standards/codes-canada/codes-development-process/proposed_changes.html

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Communicating with Customers

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Role of the Energy Advisor

- EAs can improve clients' health by informing them about radon during an assessment
- Engage in a health-focused discussion, highlight testing for radon is a cancer prevention measure
- For renovation clients:
  - Inform clients about radon and encourage testing **before** starting a renovation as a mitigation system (if needed) can be more easily installed at less cost
  - Share information about mitigation strategies to prepare them for potential mitigation decisions after testing
  - Recommend more testing **after** renovating as radon levels can change

Homeowner Resources

- Health Canada: Radon and Energy Retrofits
- Betterhomesbc.ca

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Role of the Energy Advisor

- ERS procedures do not require EAs to specifically mention radon
- NRCan provides standard text in RUR about radon and where to access information. It considers homeowner responsible for radon testing
- **BEST PRACTICE**: Inform clients about radon and what they can do
- Refer homeowners to professionals at CARST or C-NRPP

- **NOTE:** CACEA was advised by their preferred insurance provider that currently, their Errors and Omissions insurance policy would cover related claims

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Ontario Home Warranty and Radon

- Within first 7 years of a newly constructed home, if radon gas exceeds Health Canada's acceptable levels of 200Bq/m^3, Tarion will cover mitigation costs up to $15,000 using a C-NRPP Mitigation professional
- Note it is the builder who pays the bill
- For an accepted claim, the homeowner must supply test results to show test was conducting properly

TARION™
BUILDING CONFIDENCE

https://www.tarion.com/homeowners/your-warranty-coverage/radon-and-your-warranty

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Resources

Anne-Marie & Pam Warkentin

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CARST -

Canadian Association of Radon Scientist and Technologist

Provides:

- Resources for homeowners
- Training for radon professionals
- Source for measurement (testing) and mitigation professionals
- Visit https://carst.ca

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C-NRPP: Canadian National Radon Proficiency Program

Radon training and certification program for radon professionals certifying Radon Measurement and Radon Mitigation Professionals. Visit https://c-nrpp.ca/

- **C-NRPP Measurement Certification**
  16hr online course
- **C-NRPP Mitigation Certification**
  24hrs online and in-person course plus full hands-on mitigation install; Measurement is a pre-requisite
- **C-NRPP CRNCH**
  Controlling Radon in New Canadian Home course for New Construction 4-6hrs online and in-person course
- **Real Estate Certificate Course**
  2x 1-hr sessions

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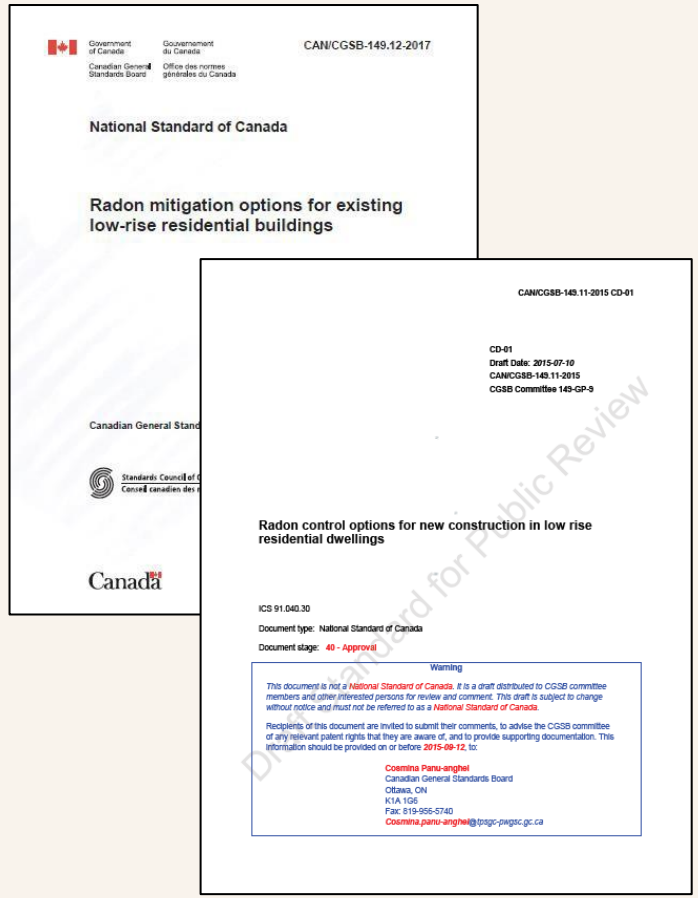
Radon Guidelines and Standards

Health Canada Santé Canada

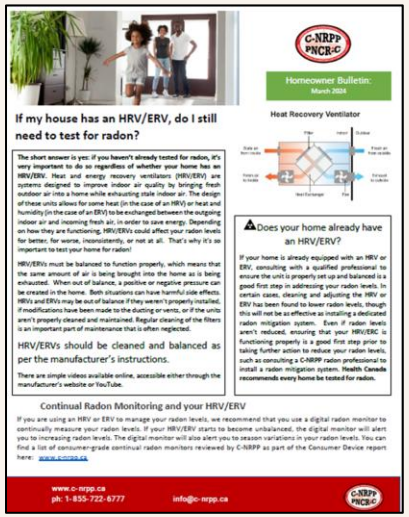
Guidance Documents

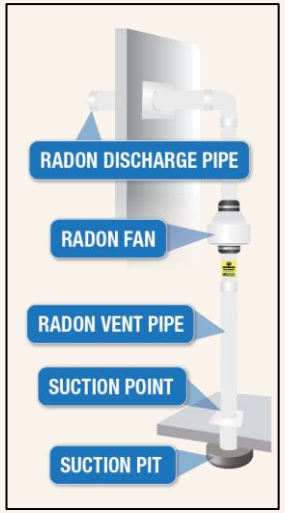
Best Practices



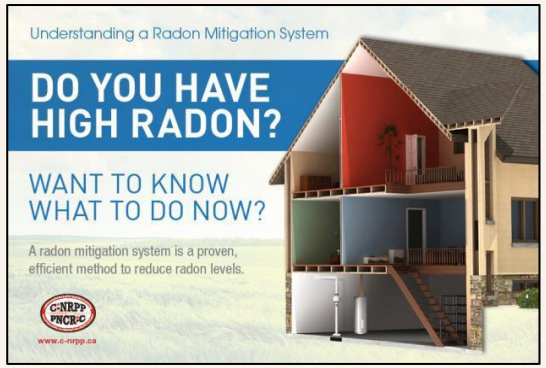
Standards

Resources and Information





HRVs/ERVs and Radon

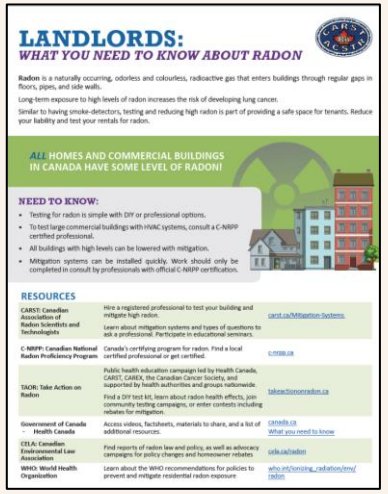


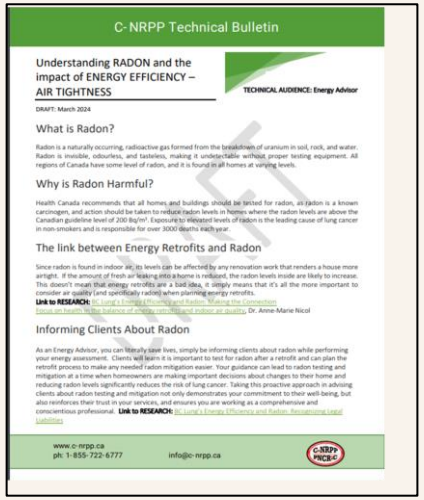
Homeowner Information

Web-based Builder Information

Real Estate

Landlord and Tenant Information





EA Information

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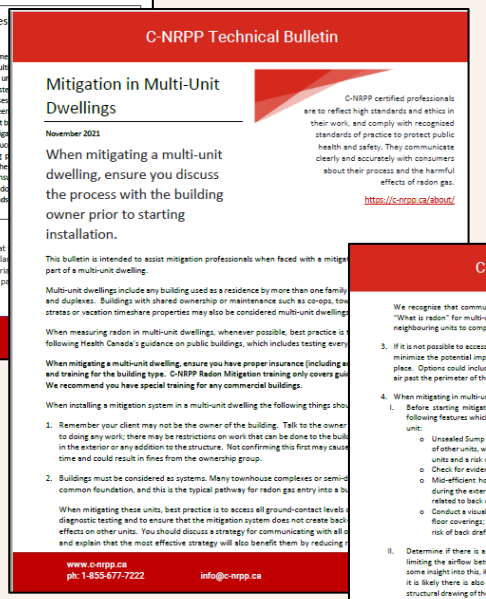
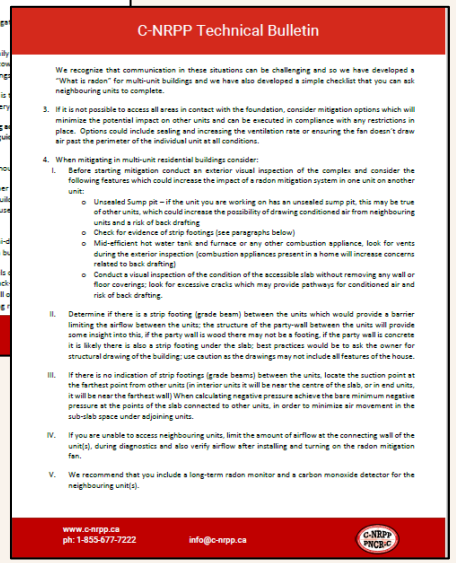
Bulletins





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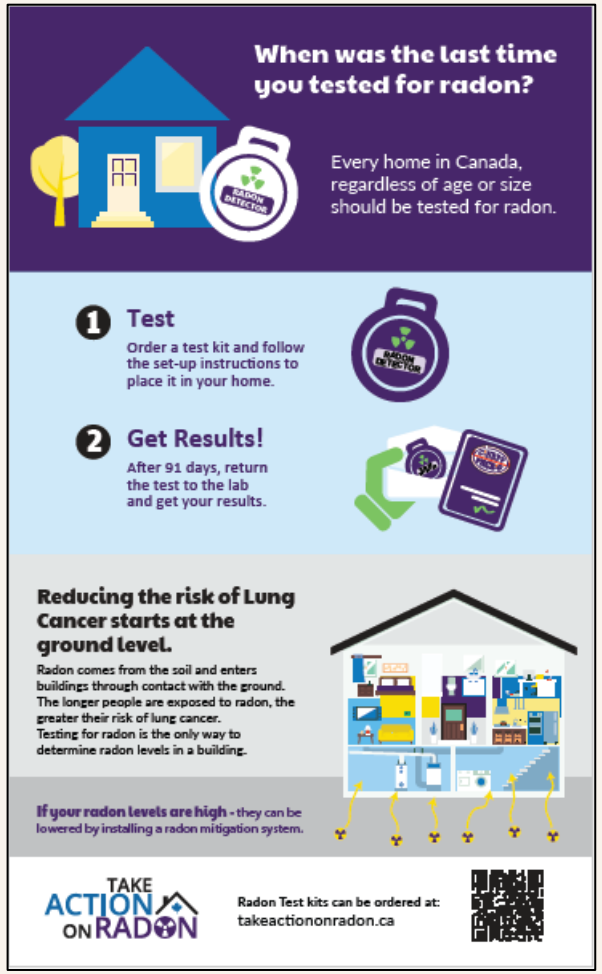
New Resources

TAKE ACTION ON RADON | OCCUPE TOI DU RADON

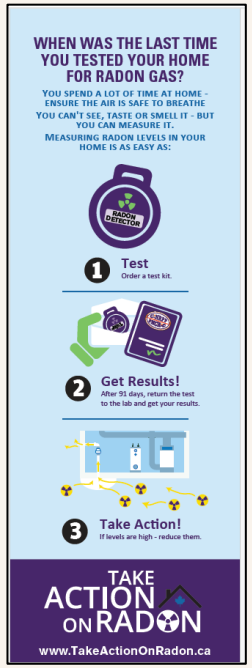
Postcard (French on reverse)

Pins

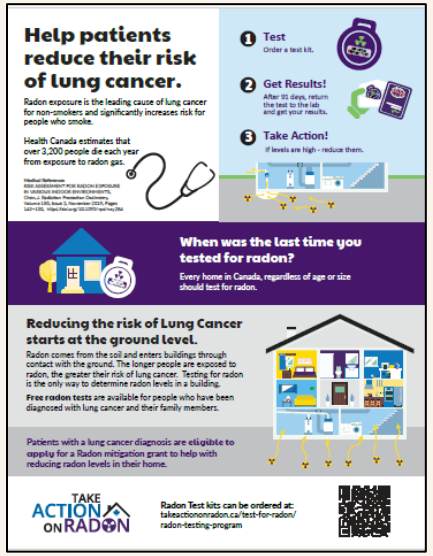
Window Clings



Poster (French on reverse)



Pull-up banner (bilingual)



Medical Practitioners Information (French on reverse)

Also provides playing cards, carpenter pencils and measuring tapes handed out at events.

https://knowvember.ca/en/

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Canadian Cancer Society | Société canadienne du cancer

Order online: https://form.jotform.com/91975565858277

Research and Papers

BC Lung Association

- *Energy Efficiency and Radon: Making the Connection* reviews academic literature on the links between efficiency measures and radon.
- *Energy Efficiency and Radon: Recognizing Legal Liabilities* emphasizes that the duty of care on personnel in the energy efficiency industry to ensure they do not put clients at elevated health risk.
- *Energy Efficiency and Radon: Gaps in the System* analyzes current energy efficiency system in Canada and reviewed building codes, green building standards, as well as training and certification for energy advisors and key grant programs.

https://bclung.ca/lung-health/radon/

Questions?

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Thank you

CACEA Canadian Association of Consulting Energy Advisors

CACEA Canadian Association of Consulting Energy Advisors

Our Mission

To support a sustainable and recognized profession of valued and credible Canadian Energy Advisors (EA).

Our Mandate

Ensure credible, skilled members and be a valued, respected sector partner.

Our Members

Includes EAs; suppliers; building community stakeholders; and those in the process of becoming registered EAs. **Members are held to a high standard:** E&O; 18 hrs CEC; Code of Ethics and Professional Conduct; SO verification letter

Members across Canada access to:

- knowledge and information;
- a supportive network;
- a unified voice to influence change; and
- discounts to equipment, training, and more.

Contact

Cindy Gareau, Executive Director
manager@cacea.ca • 888-315-2774 • www.cacea.ca

CACEA promotes sustainable building practices and contributes to:

R-2000 ENERGUIDE ENERGY STAR HIGH EFFICIENCY HAUTE EFFICACITÉ netzero home BuiltGreen

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