



## What Is Radon Gas?

Radon occurs naturally when uranium breaks down in rock and soil. It is an invisible, odourless and tasteless gas.

When radon leaves the ground it is usually diluted in air and is relatively harmless. However, radon can seep into buildings through small cracks and openings where the building contacts the soil.

About 7% of homes and 4% in Canada have radon over the National Radon Guideline of 200 Bq/m<sup>3</sup>. In some communities in British Columbia more than half of homes have high radon. Radon testing is easy and techniques to lower radon levels are effective and can save lives.

## Radon and Human Health

Radon is naturally occurring radiation and when breathed in it can cause lung cancer. Radon gas is the #1 cause of lung cancer in non-smokers. High radon causes

approximately 3,360 deaths per year in Canada. Health Canada research estimates that with lifetime exposure at 800 Bq/m<sup>3</sup>, the lifetime lung cancer risk would be one in 20 for non-smokers, and one in three for smokers. For radon test results between 200 and 600 Bq/m<sup>3</sup>, Health Canada recommends taking steps to reduce the radon level within two years. If results are greater than 600 Bq/m<sup>3</sup>, Health Canada recommends to reduce the level within one year.

## Increasing Awareness of Radon

Radon has been under the radar in BC but this is changing, with:

- Changes to the BC Building Code
- Testing of government buildings through Shared Services BC
- Efforts by the Interior Health Authority to require radon testing as part of day-care licensing
- New guidance in 2020 from the British Columbia Real Estate Association and Real Estate Council of British Columbia for real estate agents and property managers to treat radon as a latent defect

Commercial building owners, operators and managers also need to pay attention to radon.

## Testing for Radon

Some regions have more radon than others. Health Canada has developed a [radon risk map](#) but more community level data is still needed to estimate radon risks for each

community. The only way to know radon levels in a building is to test.

Digital monitors are available offering short-term tests. These give a momentary snapshot, and users should know that radon levels can vary significantly over time.

Best practice involves placing long-term 'alpha tracker' testing kits in the lowest inhabited rooms for 91 days. These hockey-puck sized units cost \$20 to \$60 and are available at leading retailers or from the British Columbia Lung Association at our [website](#), by email: [info@bc.lung.ca](mailto:info@bc.lung.ca), or by phone: 604.731.LUNG (5864).

Health Canada has produced a [Guide for Radon Measurement in Public Buildings](#).

## Avoiding High Radon in Buildings

Elevated radon can be avoided in new construction. In many buildings, especially low-rise residential buildings, the best systems use "sub-slab depressurization". A hole in the building foundation and a vent pipe ensures low pressure on the ground floor does not result in radon being sucked into the space. In some larger building and commercial spaces, adjustments can be made to the Heating, Ventilation and Air Conditioning System to dilute radon levels.

In older buildings, if the radon reading turns out to be higher than 200 Bq/m<sup>3</sup>, professional radon mitigators can assess the building and install systems. The [Canadian National Radon Proficiency Program](#) (C-NRPP) has lists of certified radon mitigation professionals by community.

## Duty of Care

Duty of care means that someone has a legal responsibility not to do something that could likely cause harm to others. A duty of care is owed to the occupants of a building if it is foreseeable that failure to take reasonable care could lead to defects (like radon) that pose danger to the occupants' health and safety.

Commercial building owners, operators and managers occupants have this duty of care. The *Occupiers Liability Act* specifies this for people who have responsibility for and control over premises.

This applies with respect to radon. If a space has high radon, future people who use it can develop lung cancer. Commercial building owners, operators and managers can reduce risk through testing for radon and mitigating if average levels are at or above 200 Bq/m<sup>3</sup>.

## Occupational Health and Safety

Radon induced lung cancer is listed as an occupational disease in the *Workers Compensation Act (WCA)*. Otherwise, the WCA and the Occupational Health and Safety Regulation (OHSR) do not specify radon levels. However, the OHSR has clear rules on ionizing radiation (s. 7.19-24) and also puts on employers a 'general duty' to ensure workplaces are safe (s. 2.2).

Under the OHSR, regular inspections are required to prevent unsafe working conditions, and unsafe working conditions must be fixed immediately (ss. 3.5, 3.9).

the Federal-Provincial Territorial Radiation Protection Committee provides guidance on radon in the workplace in the [Canadian Guidelines for Naturally Occurring Radioactive Materials \(NORM\)](#). This confirms that the 200 Bq/m<sup>3</sup> action level should also apply in workplaces.

Ontario has adopted the formal policy that the 'general duty clause' includes protection from elevated radon. The guidance is easily accessed through the [Radon in the Workplace](#) website. It follows the NORM Guidelines to establish 200 Bq/m<sup>3</sup> as the level at which radon mitigation to as low as reasonably achievable should begin. This same reasoning should apply in BC.

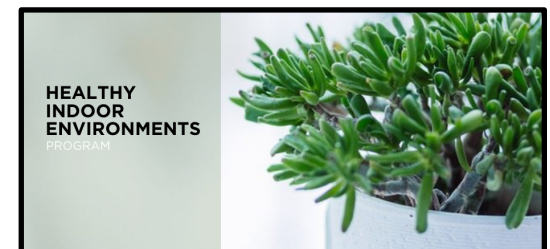
BC's OHSR also has rules on ionizing radiation (sections. 7.17 to 7.22). Radon is widely understood to produce ionizing radiation. Normal workers should not be exposed to a level of radiation that does not significantly increase health risk. This is measured in millisieverts, a measure of radiation dose. In the OHSR this is set at an effective dose of 1 mSv. The NORM Guidelines explain that a worker exposed to 200 Bq/m<sup>3</sup> over a 2000 hour work-year will receive a dose of radiation only a little more than 1 mSv.

In most workplaces, these standards will be reasonably met if building operators test for radon and if levels are at or above 200 Bq/m<sup>3</sup> take steps to mitigate using CNRPP certified radon mitigators. If radon levels cannot be brought down, there are special rules in NORM Guidelines and the OHSR for monitoring, measuring and managing radiation exposures.

## Legal Opinion

Owners, operators and managers of commercial buildings need to address radon as part of general requirements for health and safety. As popular understanding of radon grows, it is likely that commercial building owners, operators and managers will face pressure to address radon. They can take steps now to minimize risk—by having buildings tested, posting test results for people who work in and regularly visit the building, and if levels are at or over 200 Bq/m<sup>3</sup> hiring C-NRPP certified professional mitigators to address the situation.

This is an abridged version of a more detailed brief, titled **RADON: Commercial Buildings and BC Law**, which includes further information, resources and legal analysis. It is available for free at: <https://bc.lung.ca/programs-initiatives/healthy-indoor-environments-program/current-projects/radon-rights-and-duties>



For information on our programming see <https://bc.lung.ca/programs-initiatives/healthy-indoor-environments-program> or contact [healthyindoor@bc.lung.ca](mailto:healthyindoor@bc.lung.ca)

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