



Radon in Air: Information from the EPA

What is Radon?

Radon is a gaseous radioactive element having the symbol Rn, the atomic number 86, an atomic weight of 222, a melting point of -71°C , a boiling point of -62°C , and (depending on the source, there are between 20 and 25 isotopes of radon - 20 cited in the chemical summary, 25 listed in the table of isotopes); it is an extremely toxic, colorless gas; it can be condensed to a transparent liquid and to an opaque, glowing solid; it is derived from the radioactive decay of radium and is used in cancer treatment, as a tracer in leak detection, and in radiography. (From the word radium, the substance from which it is derived)¹.

Where does radon come from?

Radon-222 is the decay product of radium-226. Radon-222 and its parent, radium-226, are part of the long decay chain for uranium-238. Since uranium is essentially ubiquitous (being or seeming to be everywhere at the same time) in the earth's crust, radium-226 and radon-222 are present in almost all rock and all soil and water.

How does radon get into your home?

Any home may have a radon problem.

Radon is a radioactive gas. It comes from the natural decay of uranium that is found in nearly all soils. It typically moves up through the ground to the air above and into your home through cracks and other holes in the foundation. Your home traps radon inside, where it can build up. Any home may have a radon problem. This means new and old homes, well-sealed and drafty homes, and homes with or without basements.

Radon from soil gas is the main cause of radon problems. Sometimes radon enters the home through well water. In a small number of homes, the building materials can give off radon, too. However, building materials rarely cause radon problems by themselves.

The amount of radon in the soil depends on soil chemistry, which varies from one house to the next. Radon levels in the soil range from a few hundred to several thousands of pCi/L (picocuries per liter) in air. The amount of radon that escapes from the soil to enter the house depends on the weather, soil porosity, soil moisture, and the suction within the house.



What is EPA's Action Level for Radon and What Does it Mean?

Radon in air is ubiquitous (existing or being everywhere at the same time). Radon is found in outdoor air and in the indoor air of buildings of all kinds. EPA recommends homes be fixed if the radon level is 4 pCi/L (picocuries per liter) or more. Because there is no known safe level of exposure to radon, EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L.

The average indoor radon concentration for America's homes is about 1.3 pCi/L. It is upon this national average indoor level that EPA based its estimate of 21,000 radon-related lung cancers a year. The average concentration of radon in outdoor air is 0.4 pCi/L or 1/10th of EPA's 4 pCi/L action level.

How can my results be a negative number?

All radiation results are background subtracted before they are reported. A negative number occurs when the background counts per minute (CPM) are higher than the sample's counts per minute (CPM). The EPA requires that all values be reported because of the inherent uncertainty with radiation analysis. With this, you might end up with a negative number occasionally on your final report. The background adjusted result is the one that can be used to determine the radon level in your sample.

For more information, please visit the following websites:

United States Environmental Protection Agency (USEPA)

<https://www.epa.gov/radon>

Centers for Disease Control and Prevention (CDC)

<https://www.cdc.gov/features/protect-home-radon/index.html>

Agency for Toxic Substances and Disease Registry (ATSDR)

<https://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=407&tid=71>

National Institute of Health (NIH)

<https://newsinhealth.nih.gov/2019/07/test-your-home-radon>

<https://newsinhealth.nih.gov/2013/01/radon-risk>

Health Canada

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

Questions

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