Radon Gas
More Powerful Than a Locomotive

Remember the classic Superman comics? No, not the recent silly mega-not-so-blockbuster flicks but the really ace comic books.

Remember Kryptonite? In super-powered Kryptonians (like Superman, of course), Kryptonite causes immediate physical pain and debilitation and kills within hours.

Even if you're a human, you can't ignore Kryptonite – it's bright and it's green and it glows. We suspect that you'd run out of the house screaming if you noticed slowly creeping, bright green fog rolling across your floors.

If only radon gas were that obvious. Unfortunately, radon *doesn't* manifest that way. In fact, radon doesn't visibly manifest *at all*. Radon is a naturally occurring gas that completely ignores your five senses: see no radon, smell no radon, taste no radon, hear no radon or touch no radon.

Radon (Rn): The (Not So) Noble Gas

Noble gases comprise a group of six chemical elements with similar properties: odorless, colorless, monatomic gases with very low chemical reactivity. Radon (Rn) has five friends: helium (He), neon (Ne), argon (Ar), krypton (Kr), and xenon (Xe).

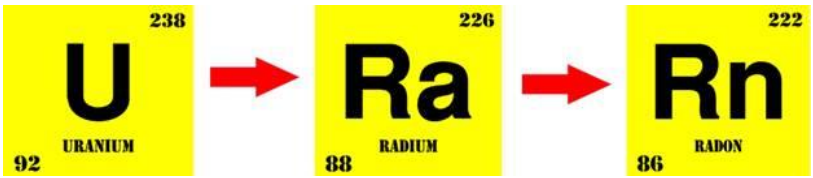
Superman strongly dislikes Kr. Humans strongly dislike Rn. Why?

Because radon is radioactive and exposure can lead to lung cancer.

You're Not *Really* Going to Make Me Learn About Chemistry, Right?

Learning chemistry can be fun for everyone. No, seriously.

Radon is an unfortunate "leftover" of the decay chain of uranium. Uranium deposits in the soil are common all over Planet Earth. As uranium decays, it produces radon. As radon decays, it produces gamma rays, beta particles, and alpha particles.



Alpha particles are bad. Alpha particles from radon and radon decay products can cause physical and chemical damage to the highly sensitive stem and basal cells of the human lungs.

The relevant damage is to the DNA molecules of those cells, of which the genes that control the activity of the cell are composed. Damage to DNA can cause mutated cells to multiply rapidly and uncontrollably.

Radon Gas, Lung Cancer and Statistics

When DNA damage occurs, it manifests as lung cancer. Radon is estimated to cause >21,000 lung cancer deaths in the US annually – more than drunk-driving related deaths. We certainly don't want to bore you to tears with statistics, but there are some relevant facts that reveal the ubiquity and insidious nature of radon gas.

The US Surgeon General notes that indoor radon is the leading cause of lung cancer among non-smokers in the US. Overall, the number one leading cause of lung cancer is smoking. And when you combine smoking *with* radon exposure, it's a double whammy for increased chances of developing lung cancer.

Radon doesn't discriminate – radon has been detected in every type of home in every county in the US. The amount of radon in the air is measured in "picocuries per liter of air" or pCi/L. According to the US Environmental Protection Agency (EPA), one in every 15 homes nationally has a high radon level at or above the EPA's recommended radon action level of 4 pCi/L.

Radon Risks in Black and White and Red and Green

	Smoker[1]		Non-smoker		
Radon Level	Statistics[2]	Comparable Risk[3]	Statistics[2]	Comparable Risk[3]	Mitigation
20.0 pCi/L	About 260 people could get lung cancer	250x risk of drowning	About 36 people could get lung cancer	25x risk of drowning	Fix the home
10.0 pCi/L	About 150 people could get lung cancer	200x risk of drowning	About 18 people could get lung cancer	20x risk of fatal home fire	Fix the home
8.0 pCi/L	About 120 people could get lung cancer	30x risk of fatal fall	About 15 people could get lung cancer	4x risk of fatal fall	Fix the home
4.0 pCi/L	About 62 people could get lung cancer	5x risk of fatal car crash	About 7 people could get lung cancer	1x risk of fatal car crash	Fix the home
2.0 pCi/L	About 32 people could get lung cancer	6x risk of fatal car crash	About 4 people could get lung cancer	1x risk of fatal poisoning	Consider mitigation
1.3 pCi/L	About 20 people could get lung cancer	Average indoor radon level	About 2 people could get lung cancer	Average indoor radon level	Reduction below 2 pCi/L is difficult

1 If you're a former smoker, your risks may be lower.

2 Assumes 1,000 people are exposed to specified radon level over a lifetime; EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003) at www.epa.gov/radon/healthrisks.html.

3 Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

Sneaky Radon – How It Gets Into Your Home?

It's not like we invite radon into our homes, so how does it get there? Radon gas diffuses through the soil and is sucked *into* the house because the air pressure in the house is generally lower than the soil. Common entry routes for radon include:

- Cracks in solid floors
- Construction joints
- Cracks in walls
- Gaps in suspended floors
- Gaps around service pipes
- Cavities inside walls
- Water supply

Radon Testing: Superhuman Strength Not Required

Unless you live on the planet Krypton, we're pretty sure you're starting to wonder if you have radon in your own home. The bad news is that radon is invisible. The good news is that detecting radon doesn't require leaping tall buildings in a single bound.

Given the serious health risks associated with radon, we recommend testing the house ASAP. Testing is the *only* way to determine a home's radon levels. US Inspect performs thousands of radon tests annually for residential and relocation customers. Our continuous radon monitor is one of the most accurate and reliable radon measurement devices available. Our radon technicians offer the advantage of a tamper resistant radon test conducted as an independent third party, particularly relevant for real estate transactions.

Radon Testing: The "How To"

The EPA recommends a short-term (48 hour) test under "closed house conditions," which allows radon levels to reach dynamic equilibrium, meaning that the radon entry rate stabilizes. Closed house conditions must be implemented for a minimum of 12 hours before testing and must be maintained throughout the entire test period. All windows and doors need to be closed but normal use of exterior entry and exit doors and operation of kitchen fan, bathroom fans, and heating and AC systems that recirculate air are acceptable.

There are two types of 48 hour radon testing devices: active and passive. Active devices – pulsed ionization chambers, solid state silicon detector monitors – provide accurate results and can be outfitted with tamper-detecting features. Active devices also record data at a rate of at least once an hour, which provides readings to average together, ensuring greater accuracy.

Avoid testing with passive devices such as charcoal canisters, liquid scintillation detectors, and electret ion chambers (E-Perms) because such devices offer no protection against tampering, which could occur during real estate transactions simply by opening the windows.

The EPA and the Surgeon General recommend testing all homes on the lowest level that can be used. The Surgeon General recommends testing a home for radon every two years, and re-testing any time you move, make structural changes to your home, or occupy a previously unused level of the house.

Want more info on radon testing? Check out the Citizen's Guide to Radon (www.epa.gov/radon/pdfs/citizensguide.pdf) or the Homebuyer's and Seller's Guide to Radon (www.epa.gov/radon/pdfs/hmbuygud.pdf), which is the standard used by US Inspect because the guide specifically recognizes and addresses time constraints and challenges associated with all relocation and real estate-related radon tests.

Reading Radon Results

4 pCi/L is the magic threshold – if test results indicate levels at or above 4 pCi/L, mitigation *must* be effected as soon as possible.

The average indoor radon level in US homes is 1.3 pCi/L. More than 1 million homes in the US have radon levels above 8 pCi/L. More than 60,000 homes in the US have radon levels above 20 pCi/L.

The EPA believes that *any* exposure to radon carries *some* risk, i.e., even radon levels *below* 4 pCi/L constitute some risk. Therefore, the EPA is actively promoting the Surgeon General's advice: test *all* homes for radon. The National Research Council's (NRC) BEIR (Biological Effects of Ionizing Radiation) VI Report concluded that even very small exposures to radon can result in lung cancer; the NRC also concluded that no evidence exists that shows a threshold of exposure below which radon levels are harmless.

Although our focus is on radon gas, radon in water may also be a contributing factor to indoor radon levels. If the home's water supply comes from ground water (e.g., a private well or a public water supply using ground water), radon may be a concern, especially if you've already found elevated levels of radon in the indoor air. In such cases, the EPA recommends having the water tested. If testing determines that radon in water levels are a significant factor, remediation of the water supply may be warranted.

Bottom line – you can always reduce your risk of lung cancer by reducing the level of radon in your home.

It's a Bird, It's a Plane, No, It's…Radon Remediation

By now, it's probably not a surprise to expect elevated radon levels. If a home has elevated radon levels, hire a qualified contractor to fix the problem. Qualified radon contractors are best equipped to determine the proper approach to remediate a home.

There are several methods of radon remediation, the most common of which is Active Sub-Slab Depressurization, or Sub-Slab Ventilation, using a Sub-Slab Suction system. This type of system draws radon gas from below the slab and discharges it above the roofline, drastically reducing the quantity of gas entering the home. Sealing cracks in the foundation of the home and any other gaps will help improve the efficiency of such a system.

Radon in water can be remediated via aeration, in which water is sprayed into a tank, forcing separation of the radon gas from the water before it enters the home's water supply, or Granulated Active Carbon (GAC) filtration, in which water passes through a carbon filter bed which adsorbs the radon, separating it from the water before it enters the home's water supply.

Up, Up and Away! US Inspect's Radon Testing Program Plan Warranty

In order to address the unique needs of the relocation industry, US Inspect developed the Radon Testing Program Plan (RTP Plan), a warranty plan designed for post-closing.

US Inspect's RTP Plan provides a warranty that covers mitigation costs after buyers have purchased and closed on the home. When the warranty is initiated, the homeowner is provided with a long-term radon testing device. After the testing term is complete, the homeowner mails the radon test devices to a radon lab for evaluation.

If the radon level is equal to or exceeds the EPA's action threshold of 4.0 pCi/L, the cost of reducing the radon concentration is covered under the US Inspect RTP Plan. The US Inspect RTP Plan employs long-term testing which is more accurate and eliminates the need to meet closed house conditions.

The advantages of the US Inspect RTP Plan for a relocation property include:

- No scheduling hassles
- No need for transferee to endure closed house conditions
- No out-of-pocket mitigation costs for transferee
- Allows buyers to test at their convenience to ensure validity of test
- Cost of mitigation covered under the warranty

We thought radon would be especially interesting at this time of year because January is National Radon Action Month. Test Your Home. Protect Your Health.

If you or your clients have any questions about radon or any inspection type, US Inspect is pleased and available to guide and assist you.

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About Us Inspect

www.usinspect.com

US Inspect is the nation's leading inspection services firm, delivering residential and corporate relocation inspections since 1987. Our reputation is built on decades of honesty, integrity and excellent service to our customers at one of the most important decisions in their lives – buying or selling a home. We are committed to ensuring that each of our customers enjoys an exceptional inspection experience.

Please contact marketing@usinspect.com if you have any questions or require assistance.