Radon: Frequently Asked Questions

What is radon and why is it a concern?

Radon is a radioactive gas that comes from the breakdown of naturally occurring uranium in soil and rock. It is invisible, odorless and tasteless, and can only be detected by specialized tests. Radon enters homes through openings that are in contact with the ground, such as cracks in the foundation, small openings around pipes, and sump pits.

Radon, like other radioactive materials, undergoes radioactive decay that forms decay products. Radon and its decay products release radioactive energy that can damage lung tissue. The more radon you are exposed to, and the longer the exposure, the greater the risk of eventually developing lung cancer. Radon is the second leading cause of lung cancer in the United States, resulting in 15,000 to 22,000 deaths per year. Radon is the leading cause of lung cancer for non-smokers.

In view of the potentially serious public health problem, the U.S. Environmental Protection Agency (EPA) and the Department of Environmental Protection (DEP) recommend that you take action to mitigate your home if your test results indicate radon levels of 4 pCi/L of radon or more. There is no safe level of radon since lung cancer can result from low exposures to radon, however, the risk decreases as the radon concentration decreases. If your test result is less

than 4 pCi/L, you may want to discuss with mitigation companies whether the radon level can be brought down still further. In about half the homes that have been mitigated in New Jersey, radon levels have been brought to less than 1 pCi/L.

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How do I test my home for radon?

The New Jersey Department of Environmental Protection (DEP) recommends that all homes be tested for radon. Homeowners can test for radon themselves or hire a New Jersey certified radon measurement company to perform the testing. Some certified radon measurement companies sell test kits, and test kits are often available in hardware stores or from local health departments. A list of certified companies, including companies that can mail you a "do-it-yourself" test, is available at **www.njradon.org** or call the Radon Section at **(800) 648-0394**.

If you buy your test from a retail store, make sure that the kit is labeled with the New Jersey certification number of the company that produced the test kit (the number will begin with "MEB9" followed by 4 digits). If you hire a contractor to do the test, make sure the technician who places and picks up the test device is certified by the State, by checking their DEP certificate or calling the Radon Information Line. It is against the law to do radon testing or mitigation without certification in New Jersey.

What kinds of tests can I use to test my home?

Short-term Tests:

A single short-term test of 2-7 days in length can be used to indicate the radon level in your home. If a single short-term test reveals levels of 4 pCi/L or more, DEP data indicate that subsequent testing would confirm that levels in the home are 4 pCi/L or more in 80% of cases. If a second short-term test is conducted in the same location (either simultaneously or at different points in time), and the results of the tests are averaged, the average will provide a slightly more accurate estimate of radon levels. A variety of short-term test devices are available, including charcoal canisters, electrets, and continuous radon monitors. The DEP Radon Section considers all short-term test devices used by certified companies to be equally reliable.

Long-term Tests:

A long-term test of 3-12 months will provide your best estimate of average exposure over time, since radon levels fluctuate daily and by season. Because gases are drawn to areas of lower pressure, radon gas will enter the home at a rate that depends on the air pressure inside the home, which is affected by temperature, wind conditions, exhaust systems in the home, etc. Long-term testing should include the winter months, when radon concentrations are often higher than at other times. Long-term test devices are usually either alpha track detectors or electrets; both tests are considered equally reliable and accurate.

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What should I know about radon testing if I'm buying or selling a home?

A single short-term radon test may be used for real estate transactions. An escrow account, with funds set aside by the seller, can be arranged for the

buyer who prefers to test after closing. The funds can then be used to mitigate the home if testing reveals concentrations of 4 pCi/L or more.

If you are a potential homebuyer and are concerned about the possibility of test tampering, discuss anti-tampering methods with the radon measurement contractors you are considering hiring. Also, be sure to check that the contractor will close and pick up the test, as required by regulation. Neither the buyer, the homeowner nor the real estate agent can perform any part of the test, including: closing the test, picking it up, or sending it to a laboratory. If a homeowner is testing their home for themselves, they may do all or part of the test.

How is a radon test conducted?

If you do the test yourself, the process is very simple. You need only follow the testing instructions and complete the form that accompanies the test device. The device should then be mailed without delay to a laboratory using a pre-addressed envelope enclosed with the kit.

The following guidelines should be used by both homeowners and measurement companies. For both long-term and short-term tests, the testing device must be placed:

- In the lowest *livable* level of the home -- that is, the lowest level of the home that is used, or could be used, as a living space. This would include, for example, a first floor without a basement, and a finished or unfinished basement, but not a crawl space.
- In a location where it will not be disturbed.
- At least 20 inches from the floor, at least 4 inches away from other objects and at least 36 inches away from doors, windows or other openings to the outside. The tests only need to be placed

one foot away from exterior walls that have no openings. If suspended from the ceiling, it should be in the general breathing zone.

Test kits should not be placed:

- In areas exposed to direct sunlight, drafts, high heat, or high humidity; or
- In kitchens, bathrooms, laundry rooms or closets.

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In addition, attic and window fans, fireplaces and wood stoves (unless they are the primary heat source) should not be used for the duration of the test. They will affect air pressure in the house which will in turn affect radon concentrations. Air conditioning can be used if it circulates inside air rather than bringing in air from the outside.

For short-term tests, it is very important to maintain "closed house conditions," since ventilation can increase or decrease radon levels in unpredictable ways. This means all windows and doors that let in outside air, on all floors, must be kept closed except for normal entrances and exits. You need to maintain closed house conditions until the short-term test is finished. For tests that last less than four days, closed house conditions must be started at least 12 hours before you begin the test.

When I receive my test results, how do I interpret them?

The test report will usually give your radon reading in picoCuries per liter (pCi/L). PicoCuries per liter is a measure of how much radiation is in a liter of air, which is about the size of a quart. Sometimes results will be given in

Working Levels (WL). You can calculate the pCi/L level by multiplying the WL reading by 200.

The DEP and the Environmental Protection Agency (EPA) both recommend that you take action to mitigate your home if your test results indicate radon levels of 4.0 pCi/L of radon or more. If you used two or more short-term tests at the same location, the results should be averaged.

There is no truly "safe" level of radon since lung cancer can result from very low exposures to radon - however, the risk decreases as the radon concentration decreases. If your test result is less than 4.0 pCi/L, you may want to discuss with mitigation companies whether the radon level can be brought down still further. In about half of the homes that have been mitigated in New Jersey, radon levels have been brought to less than 1 pCi/L.

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Radon Risk for Smokers and Nonsmokers

(Source: National Academy of Sciences, *Biological Effects of Ionizing Radiation,*

***Sixth Report*, 1998)**

Radon Level (in pCi/L)	Odds for non-smokers* of developing lung cancer due to radon if exposed to this level over a lifetime	Odds for smokers* of developing lung cancer due to radon if exposed to this level over a lifetime**
20	1 in 27	1 in 5
8	1 in 68	1 in 13
4	1 in 135	1 in 26
2	1 in 270	1 in 52
0.4***	1 in 1,350	1 in 260

***Smokers are defined as individuals who have smoked at least 100 cigarettes in a lifetime; non-smokers have never smoked or smoked less than 100 cigarettes in a lifetime.**

****This is in addition to the risk of lung cancer from smoking itself.**

*****Average outdoor radon concentration.**

What kind of mitigation system is needed?

The most common type of radon mitigation system is the sub-slab depressurization system. This system uses venting and sealing to lower radon levels in the home. A pipe is installed that runs from below the basement flooring to above the roofline, with a fan at the top that draws radon out from under the slab. Cracks and openings in the foundation are sealed. The radon is vented through the pipe to the outside, where it is quickly diluted.

How do I go about installing a mitigation system in my home?

You can install the system yourself, if you are highly experienced in making home repairs, or you can hire a New Jersey certified radon mitigation company to do the work for you. New Jersey certified radon mitigation professionals meet specified education and experience standards and must take continuing education classes each year to maintain their certification. It is against the law for uncertified contractors to do mitigation work in New Jersey.

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After your home has been mitigated, make sure the mitigator does a post-mitigation test to prove the system is working properly. In addition, you can contact the Radon Section to obtain a free post-mitigation test (you will have to provide a copy of your mitigation contract). Retesting your home every two years will tell you whether or not your system is still working effectively in reducing the radon level to below 4 pCi/L. If you believe that your system was not installed correctly, you can contact the Radon Section to arrange for a free inspection and test of the system.

What is the average range of cost for radon testing and mitigation?

Radon Testing:	$15-50 (to test your own home) $100-200 (to have a certified professional test your home)
Radon Mitigation:	around $1300, though prices can range from $500 to $2500

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