

Radon

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What is radon?

Radon is a naturally occurring radioactive gas produced by the breakdown of uranium in rocks and soils. Radon gas is tasteless, colorless and odorless. The only way to know if it is in your home is to test for it.

Is radon a problem in Tennessee?

Yes. The Tennessee Department of Environment and Conservation (TDEC) considers radon to be a very serious problem in our state. No matter where you live in Tennessee, there is the potential for radon to enter your home. Regardless of your zone designation or geographic location, all homes should be tested for radon. There is no zone that has no risk factor for radon.

Radon Zones in Tennessee



Zone 1 - red - has a high risk factor for radon

Zone 2 - orange - has a moderate risk factor for radon

Zone 3 - yellow - has a low risk factor for radon

What are the health effects of radon?

Radon gas has been identified as the second leading cause of lung cancer, second only to cigarette smoking. Radon is responsible for about 21,000 lung cancer deaths every year. About 2,900 of these deaths occur among people who have never smoked.

As radon gas breaks down, it emits high-energy alpha particles. These particles are in the air we breathe, and once inhaled, they can be deposited in our lungs. The energy associated with these particles can alter cell DNA, thus increasing the risk of lung cancer. Persons who smoke and live in a home with elevated radon levels are at a very high risk to develop lung cancer.

Fortunately, radon does not generally present a health risk outdoors because it is diluted in the open air. Radon can, however, build up to dangerous levels inside a house, any other buildings, or caves.

How does radon enter my home?

Radon is a radioactive gas that comes from the soil. Most homes and buildings are constructed atop the soil on a property. Air pressure inside your home is usually lower than pressure in the soil beneath and around your home's foundation. Because of this difference in air pressure, your house acts like a vacuum, drawing radon in through foundation cracks and other openings. Radon may also be present in well water and can be released into the air in your home when water is used for showering and other household uses. In most cases, radon entering the home through water is a small risk compared with radon entering your home from the soil.

How much radon is dangerous to my health?

Radon is measured in picocuries per liter of air or pCi/L. The average concentration of radon in outdoor air is 0.4 pCi/L. The average radon concentration in the indoor air of America's homes is about 1.3 pCi/L. The U.S. Environmental Protection Agency (EPA) has established 4 pCi/L as an action level in which one should initiate measures to reduce the amount of radon in a home. However, there is no safe level of radon. The EPA recommends that if the radon level detected in a home is between 2 and 4 pCi/L, steps should be taken to reduce it to below 2 pCi/L.

How can I test for radon in my home?

Testing for radon in your home is very easy to do. [Test your home for radon!](#) There are no exceptions! Every home in Tennessee should be tested especially when you consider the fact that radon related lung cancer kills approximately 21,000 people each year.

The Tennessee Department of Environment and Conservation (TDEC) operates a statewide indoor [Radon Program](#) as part of the Office of Environmental Assistance. They offer a myriad of services and assistance: test kits for homeowners, technical information for universities, and specific materials for targeted audiences such as real estate professionals, home builders, building codes officials, home inspectors, and school officials.

I tested my home and the radon level was over 4pCi/L, what can I do?

If the results of your radon test exceeded 4 pCi/L, TDEC and EPA recommend that a follow-up test be conducted. If the follow-up test results (or the average of the two tests) also exceed 4 pCi/L, it is recommended that your home should be fixed to reduce the radon levels.

How do I get my home fixed and who can do that type of work?

There are several ways to reduce or remove radon from a home. Generally, how your home was constructed will dictate the mitigation method which will be appropriate.

In some cases, a homeowner can research the type of radon mitigation systems available, purchase the necessary materials, and install an appropriate mitigation system themselves. However, in many cases, professional help will be needed to install a radon mitigation system.

Commercial companies can be hired to install a radon mitigation system. There are many types of radon mitigation systems. Some examples are discussed in [EPA's Consumer Guide to Radon Reduction](#). Commercial companies that do radon work are not regulated by the state.

Two groups who train radon professionals are the [National Radon Proficiency Program](#) (NRPP) and the [National Radon Safety Board](#) (NRSB). Using these two external websites, you can locate a trained radon professional to measure or mitigate radon.

Be sure to check the type of certification the mitigator holds to ensure the company or person is appropriately credentialed to perform the job. It is advisable to check companies with your local Better Business Bureau (BBB) to better ensure they are reputable. Due to the potential expense involved in the installation of a mitigation system, it is also recommended that the homeowner obtain bids from several companies.

After a home radon mitigation system has been installed, follow-up radon testing should be conducted to ensure the system is working properly.

Radon-resistant new construction

Building a New Home? Consider radon-resistant new construction. New homes can be built to resist radon entry. The additional cost at the time of construction is minimal. When installed properly, the basic radon-resistant new construction techniques greatly reduce [the lung cancer risk](#) that may occur from radon in the home. When it comes time to sell your home, radon-resistant features can be an important selling point for health-conscious home-buyers. For additional information on radon-resistant new construction read [EPA's publication *Building Radon Out*](#).

Testing soil prior to building cannot predict what the radon levels will be once a home is completed. It is cheaper to install a radon reduction system during construction than to go back and fix a radon problem later. Installing radon-resistant features during construction typically costs about \$350 to \$500. In contrast, retrofitting an existing home can cost between \$800 and \$2,500. It is much easier and far less costly to prepare the subgrade and install pipe to improve soil gas flow before a foundation slab is cast.

A basic (passive) system can effectively reduce radon levels by 50%. Radon-resistant new construction incorporates techniques to seal soil gas entry points, prevent radon gas intrusion, and vent the radon outdoors. The techniques and materials needed to install a system are commonly used in construction. The features can also decrease moisture entering the home, reducing the risk for mold and other indoor air problems. If these features are already in the plans as a means of moisture control or energy efficiency, then the actual cost may be as low as \$100 or less. Homes with a passive system can be upgraded to an active system with the installation of an in-line fan that can further reduce radon levels. After occupancy, all homes should be tested for radon, even those built with radon-resistant features.

Additional Resources Additional Resources

Since concerns about radon have been in the public eye for over 20 years, there is a wealth of information available from many resources. For persons seeking more information concerning radon, visit the Web links below.

U.S. Environmental Protection Agency – Indoor Air

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

Tennessee Department of Environment and Conservation

Division of Air Pollution Control – Radon Program

<http://www.tennessee.gov/environment/apc/radon>

U.S. Environmental Protection Agency – Radon-Resistant New Construction directory

<http://www.epa.gov/radon/rrnc/directory.html>

U.S. Department of Health and Human Services

Agency for Toxic Substances and Disease Registry

Toxicological Profile of Radon

<http://www.atsdr.cdc.gov/toxprofiles/tp145.html>