

A Citizen's Guide to Radon What It Is and What to Do About It

WHAT IS RADON?

Radon is a cancer-causing, radioactive gas. You can't see radon. And you can't smell it or taste it. But it may be a problem in your home.

Radon is estimated to cause many thousands of deaths each year. That's because when you breathe air containing radon, you can get lung cancer. In fact, the Surgeon General has warned that radon is the second leading cause of lung cancer in the United States today. Only smoking causes more lung cancer deaths. If you smoke and your home has high radon levels, your risk of lung cancer is especially high.

EPA RECOMMENDS:

- *Test your home for radon—it's easy and inexpensive.*
- *Fix your home if your radon level is 4 picocuries per liter (pCi/L) or higher.*
- *Radon levels less than 4 pCi/L still pose a risk and in many cases may be reduced.*

WHERE DOES RADON COME FROM?

Radon comes from the natural breakdown (radioactive decay) of uranium found in soils and rocks containing granite, shale, phosphate, and pitchblende. In outdoor air, radon is diluted to such low concentrations that it is usually nothing to worry about. However, once inside an enclosed space (such as a home, office, or school) radon can accumulate. Indoor levels depend both on a building's construction and the concentration of radon in the underlying soil.

SHOULD I TEST FOR RADON?

Testing is the only way to know if you and your family are at risk from radon. EPA and the Surgeon General recommend testing all homes below the third floor for radon. EPA also recommends testing in schools. Testing is inexpensive and easy; it should only take a few minutes of your time.

CAN A RADON PROBLEM BE FIXED?

There are simple ways to fix a radon problem that aren't too costly. Even very high levels can be reduced to acceptable levels.

HOW DOES RADON GET INTO A HOME?

Radon is a gas which can move through small spaces in the soil and rock on which a house is built. Radon can seep into a home through dirt floors, cracks in concrete floors and walls, floor drains, sumps, joints, and tiny cracks or pores in hollow-block walls.

In some unusual situations, radon may be released from the materials used in the construction of a home or from well water. In general, however, building materials and well water are not major sources of indoor radon.

DOES EVERY HOME HAVE A PROBLEM?

No, most houses in this state are not likely to have a radon problem; but relatively few houses do have highly elevated levels. The dilemma is that, right now, no one knows which houses have a problem and which do not. While radon problems may be more common in some areas, any home may have a problem. The only way to know about your home is to test.

HOW DOES RADON AFFECT ME?

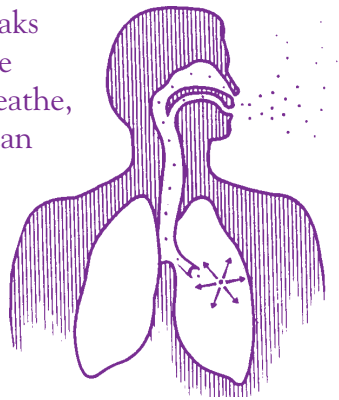
The only known health effect associated with exposure to elevated levels of radon is an increased risk of developing lung cancer. Not everyone exposed to elevated levels of radon will develop lung cancer, and the time between exposure and onset of the disease may be many years.

The United States Environmental Protection Agency (EPA) predicts that radon gas causes approximately 14,000 lung cancer deaths in this country every year. The risk from radon is much greater than the combined risk from nuclear power, asbestos, lead, PCB's and dioxin.

Your risk of developing lung cancer from exposure to radon depends upon the concentration of radon and the length of time you are exposed. Exposure to a slightly elevated radon level for a long time may present a greater risk of developing lung cancer than exposure to a significantly elevated level for a short time. In general, your risk increases as the level of radon and the length of exposure increase.

HOW DOES RADON CAUSE LUNG CANCER?

Radon, itself, naturally breaks down and forms radioactive decay products. As you breathe, the radon decay products can become trapped in your lungs. As these decay products break down further, they release small bursts of energy which can damage lung tissue and lead to lung cancer.



HOW IS RADON DETECTED?

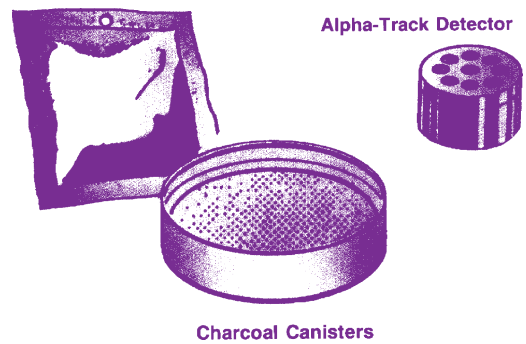
Since you cannot see or smell radon, special equipment is needed to detect it. The two most popular, passive commercially-available radon detectors are the charcoal canister and the more expensive, slower alpha track detector. Both of these devices are exposed to the air in your home for a specified period of time and sent to a laboratory for analysis.

HOW DO I TEST MY HOME?

There are two general ways to test for radon:

Short-Term Testing

The quickest way to test is with short-term tests. Short-term tests remain in your home for two days to 90 days, depending on the device. "Charcoal canisters," "electret ion chamber," and "charcoal liquid scintillation" detectors are most commonly used for short-term testing. Because radon levels



tend to vary from day to day and season to season, a short-term test is less likely than a long-term test to tell you your year-round average radon level. If you need results quickly, however, a short-term test followed by a second short-term test may be used to decide whether to fix your home.

Long-Term Testing

Long-term tests remain in your home for more than 90 days. "Alpha track" and "electret" detectors are commonly used for this type of testing. A long-term test will give you a reading that is more likely to tell you your home's year-round average radon level than a short-term test.

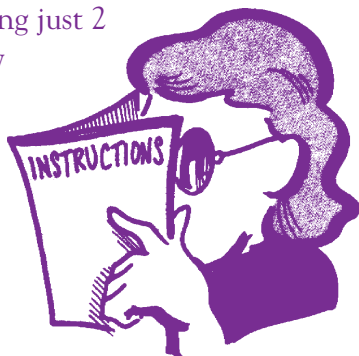
HOW CAN I GET A RADON DETECTOR?

Homeowners may obtain testing kits through their local hardware stores, mail order organizations, or private testing firms, as well as through local county Extension offices. Make sure you buy a test kit that has passed EPA's testing program. These kits will usually display the phrase "Meets EPA Requirements." If you prefer, or if you are buying or selling a home, you can hire a trained contractor to do the testing for you. Make certain you hire an EPA-qualified radon tester. In South Carolina, the

Department of Health and Environmental Control (DHEC) or the Clemson University Housing Institute can also provide information on the availability of detection devices or services.

HOW DO I USE A TEST KIT?

Follow the instructions that come with your test kit. If you are doing a short-term test, close your windows and outside doors and keep them closed as much as possible during the test. (If you are doing a short-term test lasting just 2 or 3 days, be sure to close your windows and outside doors at least 12 hours before beginning the test. You should not conduct short-term tests lasting just 2 or 3 days during unusually severe storms or periods of unusually high winds.) The test kit should be placed in the lowest lived-in level of the home (for example, the basement if it is frequently used, otherwise the first floor). It should be put in a room that is used regularly (like a living room, playroom, den or bedroom) but not your kitchen or bathroom. Place the kit at least 20 inches above the floor in a location where it won't be disturbed—away from drafts, high heat, high humidity, and exterior walls. Leave the kit in place for as long as the package says. Once you've finished the test, reseal the package and send it to the lab specified on the package right away for study. You should receive your test results within a few weeks.



EPA RECOMMENDS THE FOLLOWING TESTING STEPS:

Step 1. Take a short-term test. If your result is 4 pCi/L or higher, take a follow-up test (Step 2) to be sure.

Step 2. Follow up with either a long-term test or a second short-term test:

- For a better understanding of your year-round average radon level, take a long-term test.
- If you need results quickly, take a second short-term test.

The higher your initial short-term result, the more certain you can be that you should take a short-term rather than a long-term follow up test. If your first short-term test result is several times the action level—for example, about 10 pCi/L or higher—you should take a second short-term test immediately.

Step 3.

- If you followed up with a long-term test: Fix your home if your long-term test result is 4 pCi/L or more.
- If you followed up with a second short-term test: The higher your short-term results, the more certain you can be that you should fix your home. Consider fixing your home if the average of your first and second test is 4 pCi/L or higher.

HOW QUICKLY SHOULD I TAKE ACTION?

The average indoor radon level is estimated to be about 1.3 pCi/L, and about 0.4 pCi/L of radon is normally found in the outside air. The U.S. Congress has set a long-term goal that indoor radon levels be no more than outdoor levels. While this goal is not yet technologically achievable in all cases, most homes today can be reduced to 2 pCi/L or below. In considering whether and how quickly to take action based on your test results, you may find the following guidelines useful.

If your results are about 200 pCi/l or higher:

Exposures in this range are among the highest observed in homes. We recommend that you take action within several weeks.

If your results are between 20 and 200 pCi/l:

Exposures in this range are considered greatly above average for residential structures. We recommend that you take action within several months.

If your results are between 4 and 20 pCi/l:

Exposures in this range are considered above average for residential structures. We recommend that you take action within a year, sooner if levels are at the upper end of this range.

IF YOUR RESULTS ARE BELOW 4 PCI/L:

Exposures in this range are considered average or slightly above average for residential structures. Although exposures in this range do present some

risk of lung cancer, reductions of levels this low may be difficult, and sometimes impossible, to achieve.

Remember: There is increasing urgency for action at higher concentrations of radon. The higher the radon level in your home, the faster you should take action to reduce your exposure.

HOW DO I LOWER THE LEVELS OF RADON IN MY HOME?

Since there is no known safe level of radon, there can always be some risk. But the risk can be reduced by lowering the radon level in your home.

A variety of methods are used to reduce radon in your home. In some cases, sealing cracks in floors and walls may help to reduce radon. In other cases, simple systems using pipes and fans may be used to reduce radon. Such systems are called “sub-slab depressurization,” and do not require major changes to your home. These systems remove radon gas from below the concrete floor and the foundation before it can enter the home. Similar systems can also be

installed in houses with crawl spaces. Radon contractors use other methods that may also work in your home. The right system depends on the design of your home and other factors.

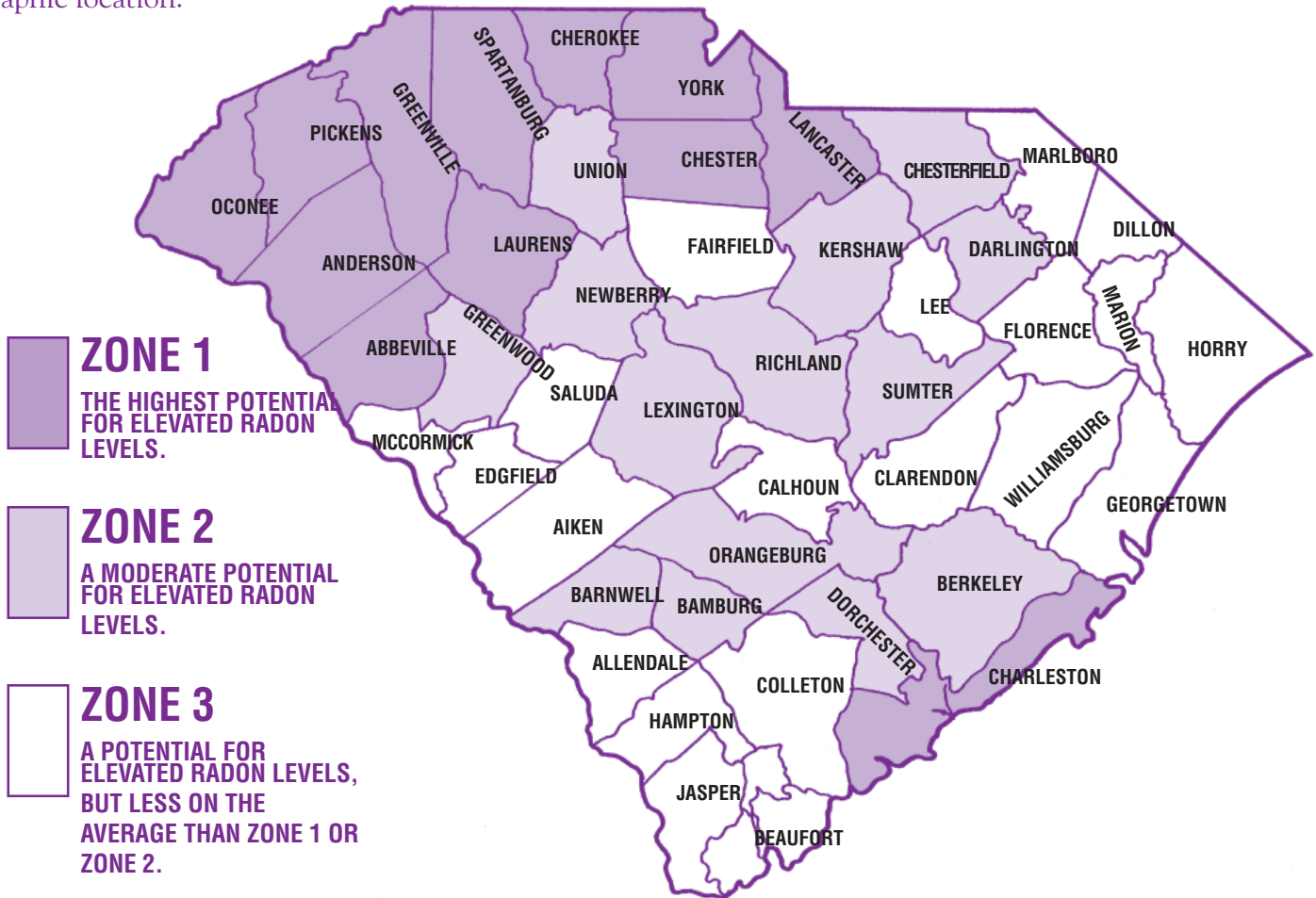
Ways to reduce radon in your home are discussed in EPA’s “Consumer’s Guide to Radon Reduction.” You can get a copy from your state radon office.

The cost of making repairs to reduce radon depends on how your home was built and the extent of the radon problem. Most homes can be fixed for about the same cost as other common home repairs like painting or having a new hot water heater installed. The average house costs about \$1,200 for a contractor to fix, although this can range from about \$500 to about \$2,500.

This pamphlet was adapted by Craig Dewitt, Clemson Extension Housing Specialist, from EPA’s “A Citizen’s Guide to Radon” (Second Edition), publication number 402-K92-001, May 1992.

South Carolina Map of Radon Zones

This map is not intended to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. All homes should be tested, regardless of geographic location.



- ZONE 1**
THE HIGHEST POTENTIAL FOR ELEVATED RADON LEVELS.
- ZONE 2**
A MODERATE POTENTIAL FOR ELEVATED RADON LEVELS.
- ZONE 3**
A POTENTIAL FOR ELEVATED RADON LEVELS, BUT LESS ON THE AVERAGE THAN ZONE 1 OR ZONE 2.

- For more information contact any of these numbers:
- Clemson University Housing Institute (864) 656-0114
 - South Carolina Department of Health and Environmental Control (800) 768-0362
 - United States Environmental Protection Agency (800) SOS-RADON

County Extension Offices

County	Telephone	County	Telephone	County	Telephone	County	Telephone
Abbeville	(864)459-4106	Chesterfield	(843)623-2134	Hampton	(803)943-3627	Oconee	(864)638-5889
Aiken	(803)649-6671	Clarendon	(803)435-8429	Horry	(843)365-6715	Orangeburg	(803)534-6280
Allendale	(803)584-4207	Colleton	(843)549-2596	Jasper	(843)726-3461	Pickens	(864)868-2810
Anderson	(864)226-1581	Darlington	(843)393-0484	Kershaw	(803)432-9071	Richland	(803)929-6030
Bamberg	(803)245-2661	Dillon	(843)774-8218	Lancaster	(803)283-3302	Saluda	(864)445-8117
Barnwell	(803)259-7141	Dorchester	(843)563-3441	Laurens	(864)984-2514	Spartanburg	(864)596-2993
Beaufort	(843)525-7118	Edgefield	(803)637-3161	Lee	(803)484-5416	Sumter	(803)773-5561
Berkeley	(843)719-4140	Fairfield	(803)635-4722	Lexington	(803)359-8515	Union	(864)427-6259
Calhoun	(803)874-2354	Florence	(843)661-4800	McCormick	(864)465-2112	Williamsburg	(843)354-6106
Charleston	(843)722-5940	Georgetown	(843)546-6421	Marion	(843)423-8285	York	(803)684-9919
Cherokee	(864)489-3141	Greenville	(864)232-4431	Marlboro	(843)479-6851		
Chester	(803)385-6181	Greenwood	(864)229-6681	Newberry	(803)276-1091		

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