



National Institutes
of Health

HOMEOWNER'S AND RENTER'S GUIDE TO REDUCING RADON AFTER DISASTERS



While natural disasters usually won't change your long-term radon risk, they can provide opportunities to install radon-resistant features. Installing a radon reduction system during rehabilitation or rebuilding, such as after a disaster, can make installation easier and less expensive.

WHY WE SHOULD WORRY ABOUT RADON

- Radon is a cancer-causing, radioactive gas. You can't see, smell, or taste radon, but it may be a problem in your home.
- Radon is the second leading cause of lung cancer in the United States, with thousands of deaths each year. If you smoke and your home has high radon levels, your risk of lung cancer is especially high.
- Radon comes from the natural breakdown of uranium and is released into the air you breathe. Radon is found all over the U.S. You and your family are most likely to be exposed to more radon at home, where you spend most of your time.

EPA recommends that you or your landlord fix your home if radon levels are 4 picocuries per liter (pCi/L) or higher. Radon levels less than 4 pCi/L still pose a risk, and in many cases can be reduced.

HOW TO FIND OUT IF YOU HAVE A RADON PROBLEM

You should test for radon. Testing is the only way to know if you and your family are at risk from radon exposure. Testing is inexpensive and easy, and millions of Americans have already tested their homes. **EPA recommends testing all homes and schools for radon.**

KEY MESSAGES

- Installing a radon system during rehabilitation or rebuilding can make installation easier and less expensive.
- Fix your home if radon levels are 4 pCi/L or higher.

You can test your own home by using radon test kits available from home improvement stores and centers. Follow the directions on the packaging for "closing up" your home (see below) and properly placing the device, and send it in after the test to get your reading. You can also hire certified radon professionals to conduct radon testing.

See <http://www.epa.gov/radon/radontest.html> for information on finding certified radon professionals and your state requirements, if any.

If you are doing a short-term radon test lasting just 2 or 3 days:

- Close your windows and outside doors and keep them closed as much as possible during the test.
- Heating and air conditioning system fans that re-circulate air may be operated, but keep the device away from vents.
- Do not operate fans or other machines that bring in outside air. Fans that are part of a radon-reduction system or small exhaust fans operating only for short periods of time may run during the test.
- Be sure to close your windows and outside doors at least 12 hours before beginning.
- Do not conduct short-term tests during severe storms or with very high winds.

In a post-disaster situation, damaged homes may not have the closed building conditions (windows, doors, roof, etc.) needed for testing. But installing a radon system during rehabilitation or rebuilding can make installation easier and less expensive.

RE-ENTERING YOUR RESIDENCE AFTER ANY DISASTER

Re-entering your home after a natural disaster can pose risks to you and your family. If rescue personnel have searched your home, it may have a FEMA search marking. Here are some tips to make sure it is safe to re-enter the home:

- Return home only when officials say it is safe.



- Do not allow children to participate in post-disaster cleanup work.
 - Check for structural safety including sagging ceilings or floors.
 - Check for loose power lines or gas leaks and make sure the electricity and gas are turned off.
 - Make sure floors are safe — water and mud make floors slippery.
 - People with breathing problems or who have weakened immune systems should stay away from the damaged residence.
 - If you find a trapped person, call 911. Do not attempt a rescue, as you may become a victim.
- Be aware of health and sanitation hazards:
 - Avoid contaminated buildings and contaminated water as much as possible.
 - Wash your hands thoroughly with soap and clean water often when working with debris.
 - Wear proper clothing and respiratory protection.
 - Inform local authorities about health and safety issues, including chemical spills, downed power lines, washed out roads and dead animals.

WHAT YOU CAN DO ABOUT RADON

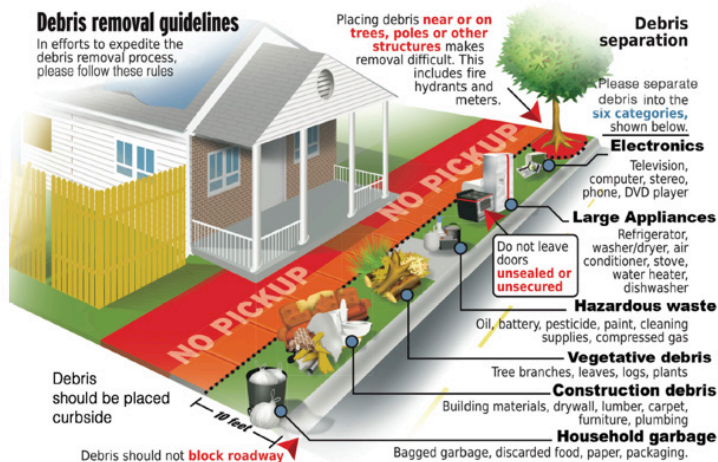
You with the help of a radon professional can fix a radon problem. Radon systems are very effective and durable. The cost of reducing radon in your home depends on how your home was built and the extent of the radon problem. Most homes can be fixed for about the same cost as other common home repairs. If your home wasn't damaged too badly, test for radon.

If you are rebuilding your damaged home or building a new home, you should build in radon-resistant features. When installed properly and completely, these simple and inexpensive features can reduce radon levels. In addition, installing them at the time of construction makes it easier and less expensive. These features include (see <http://www.epa.gov/radonoo1/rrnc/>):

- If your house is on a poorly ventilated crawl space, installing a crawl space exhaust fan.
- If your house is on a slab foundation and has high radon levels, installing a low-cost “subslab depressurization system.”
- If your house is being built or rebuilt on a new slab foundation, using a 4-inch layer of clean, coarse gravel below the “slab,” or foundation (alternatives such as a perforated pipe or a collection mat, are appropriate);
- Placing heavy duty plastic sheeting (6 mil polyethylene) as a vapor barrier on top of the gravel to reduce the amount of soil gases entering the house;
- Running a 3-inch (or 4-inch for large homes) vent pipe, like the ones commonly used for plumbing, vertically from the gravel layer (stubbed up when the slab is poured) through the house's conditioned space and roof to safely vent radon outside and above the house, installing stud shoes to reinforce any studs notched in construction, and labeling the pipe “Radon System;”
- Sealing and caulking all openings, cracks, and crevices in the concrete foundation floor (including the slab perimeter crack) and walls with polyurethane caulk; and
- Installing an electrical junction box (outlet) in the attic for a vent fan, which may be needed now or later.

Reducing radon levels requires special knowledge and skills. You should contract with a qualified radon professional who is trained to fix radon problems and can help you pick the right treatment method.

Check with your state radon office for qualified or state-certified radon professional contractors in your area (see <http://www.epa.gov/radon/whereyoulive.html>). You can also contact radon certification programs for lists of certified radon professionals in your area (see <http://www.epa.gov/radon/rnlinks.html> for links to the National Radon



Proficiency Program and the National Radon Safety Board), and see <http://www.aarst.org> for radon guidance from the American Association of Radon Scientists and Technologists. Selecting a professional to fix your radon problem is much like choosing a contractor for other home repairs — you may want to get references and more than one estimate.

If you are considering fixing your home's radon problem yourself, you should contact your state radon office for guidance and assistance.

SAFETY TIPS ON USING PORTABLE GENERATORS

If you use a portable generator for electricity, use CAUTION to avoid carbon monoxide poisoning and fires.

- Use portable generators OUTSIDE and far away from buildings.
- Do not put portable generators on balconies or near doors, vents, or windows.
- Do not use portable generators near where you or your children are sleeping.
- Never refuel a generator while it is hot.
- See the OSHA website for generator safety information: http://www.osha.gov/OshDoc/data/Hurricane_Facts/portable_generator_safety.pdf

CLEARANCE BEFORE REOCCUPYING YOUR HOME

Every new or rebuilt home should be tested after occupancy, even if it was built to be radon-resistant, to determine if the radon levels are below the EPA's action level of 4 pCi/L. Testing should be conducted after the house has been closed up. If radon levels still exceed 4 pCi/L, the radon system should be activated by installing and operating a vent fan, if it doesn't already have one.

Today, many homes are built to prevent radon from entering. Building codes in your state or local area may require radon-resistant construction features. If you are buying or renting a new home, ask the owner or builder if it has radon-resistant features. The EPA recommends building new homes with radon-resistant features in high radon potential ("Zone 1") areas. The EPA Map of Radon Zones is available at <http://www.epa.gov/radon/zonemap.html>.

LOCAL CONTACT INFO: