

Radon Reduction Techniques

There are several methods a contractor can use to lower radon levels in your home. Some techniques prevent radon from entering your home while others reduce radon levels after it has entered. EPA generally recommends methods which prevent the entry of radon. **Soil suction**, for example, prevents radon from entering your home by drawing the radon from below the home and venting it through a pipe, or pipes, to the air above the home where it is quickly diluted.

Any information that you may have about the construction of your home could help your contractor choose the best system. Your contractor will perform a visual inspection of your home and design a system that considers specific features of your home. If this inspection fails to provide enough information, the contractor will need to perform **diagnostic tests** during the initial phase of the installation to help develop the best radon reduction system for your home. For instance, your contractor can use chemical smoke to find the source and direction of air movement. A contractor can learn air flow sources and directions by watching a small amount of smoke that he or she shot into holes, drains, sumps, or along cracks. The sources of air flow show possible radon routes. A contractor may have concerns about backdrafting of combustion appliances when considering radon mitigation options, and may recommend that the homeowner have the appliances checked by a qualified inspector.

Another type of diagnostic test is a soil communication test. This test uses a vacuum cleaner and chemical smoke to determine how easily air can move from one point to another under the foundation. By inserting a vacuum cleaner hose in one small hole and using chemical smoke in a second small hole, a contractor can see if the smoke is pulled down into the second hole by the force of the vacuum cleaner's suction. Watching the smoke during a soil communication test helps a contractor decide if certain radon reduction systems would work well in your home.

Whether diagnostic tests are needed is decided by details specific to your home, such as the foundation design, what kind of material is under your home, and by the contractor's experience with similar homes and similar radon test results.

**Home Foundation Types**

Your home type will affect the kind of radon reduction system that will work best. Homes are generally categorized according to their foundation design. For example: **basement, slab-on-grade**, concrete poured at ground level; or **crawlspace**, a shallow unfinished space under the first floor. Some homes have more than one foundation design feature. For instance, it is common to have a basement under part of the home and to have a slab-on-grade or crawlspace under the rest of the home. In these situations a combination of radon reduction techniques may be needed to reduce radon levels to below 4 pCi/L.



Radon reduction systems can be grouped by home foundation design. Find your type of foundation design above and read about which radon reduction systems may be best for your home.

**Basement and Slab-on-Grade Homes**

In homes that have a basement or a slab-on-grade foundation, radon is usually reduced by one of four types of soil suction: **subslab suction, drain-tile suction, sump-hole suction, or block-wall suction**.



**Active Subslab suction** — also called **subslab depressurization** — is the most common and usually the most reliable radon reduction method. One or more suction pipes are inserted through the floor slab into the crushed rock or soil underneath. They also may be inserted below the concrete slab from outside the home. The number and location of suction pipes that are needed depends on how easily air can move in the crushed rock or soil under the slab and on the strength of the radon source. Often, only a single suction point is needed.

A contractor usually gets this information from visual inspection, from diagnostic tests, and/or from experience. A radon vent fan connected to the suction pipes draws the radon gas from below the home and releases it into the outdoor air while simultaneously creating a negative pressure or vacuum beneath the slab. Common fan locations include unconditioned home and garage spaces, including attics, and the exterior of the home.

Passive subslab suction is the same as active subslab suction except it relies on natural pressure differentials and air currents instead of a fan to draw radon up from below the home. Passive subslab suction is usually associated with radon-resistant features installed in newly constructed homes. **Passive subslab suction** is generally not as effective in reducing high radon levels as active subslab suction.

Some homes have **drain tiles or perforated pipe** to direct water away from the foundation of the home. Suction on these tiles or pipes is often effective in reducing radon levels.

One variation of subslab and drain tile suction is **sump-hole suction**. Often, when a home with a basement has a sump pump to remove unwanted water, the sump can be capped so that it can continue to drain water and serve as the location for a radon suction pipe.

**Block-wall suction** can be used in basement homes with hollow block foundation walls. This method removes radon and depressurizes the block wall, similar to subslab suction. This method is often used in combination with subslab suction.

<http://www.epa.gov/radon/pubs/consguid.html#reductiontech>