

What a Radon Reduction System Really Does and Why It Matters

When I bought my first house in St. Louis back in the early 2000s, radon was something I had heard about but never really thought about. A friend mentioned testing during the home inspection, so I picked up a radon test kit from the local hardware store. The results came back at 6.2 picocuries per liter - well above the EPA action level of 4.0. That number changed how I saw the basement. It was not just a place for storage anymore. It was a source of something invisible that could affect my family's health over time.

The solution, as I would learn over the following weeks, was a radon reduction system. That term gets thrown around a lot, but it means something specific. A properly installed system does not just lower radon levels. It creates a pathway for soil gases to move away from the house before they ever enter the living space. That distinction matters. A lot of homeowners think a radon reduction system is a filter or an air purifier you plug in. It is not. It is a mechanical system that changes the pressure relationship between the house and the soil beneath it.



How the System Works

The most common approach is active soil depressurization, which is also called sub-slab depressurization. A contractor drills a hole through the basement floor, digs out a small cavity in the gravel below, and installs a pipe that runs up through the house and out the roof. A fan, usually mounted in the attic or on an exterior wall, pulls air from under the slab and vents it above the roofline. That constant suction keeps radon from seeping through cracks and openings in the foundation.

I remember watching the installation crew from Air Sense Environmental work on a house down the street. They used a sealant around the pipe where it passed through the floor - a thick polyurethane caulk that bonds to concrete and stays flexible. They also sealed the sump pump cover and any visible cracks in the slab. Every gap matters. If you leave one unsealed, the fan has to work harder, and the [radon reduction system](#) loses efficiency. The combination of soil suction and careful sealing is what makes the whole thing work.

Why Testing Comes First

You cannot know what you need until you test. The EPA recommends testing every home, regardless of age or location. In St. Louis, the geology varies a lot. Some neighborhoods sit on limestone or shale, which produce more radon. Others have sandy soil that lets gas dissipate more easily. The Missouri Department of Health keeps maps of average indoor radon levels by county, but local variation is huge. Two houses on the same street can have completely different readings.

A short-term radon test kit gives you a snapshot. You leave it open for two to seven days, then mail it to a lab. That is fine for a first check, but radon levels can fluctuate with weather, season, and how often you run the furnace. That is why many experts, including the American Lung Association, recommend following up with a continuous radon monitor if you get a borderline result. A continuous radon monitor plugs into a wall outlet and logs readings over weeks or months. It shows you peaks and valleys that a single test might miss.

Post-Mitigation Verification Is Not Optional

After a radon reduction system is installed, you need to confirm it works. That is called post-mitigation verification. The contractor should run a test within thirty days of installation, but you should also run your own test to be sure. I have heard stories where a system was installed but the fan was undersized or the piping had a leak, and the radon level barely dropped. A manometer, which is a simple U-shaped tube filled with liquid, can tell you if the fan is pulling

adequate suction. Many systems include a fan monitoring device that beeps or flashes if the fan stops working. Those are worth the small extra cost.

Some companies offer a mitigation guarantee. That means if the radon level stays above the EPA action level after installation, they will come back and adjust the system at no charge. Air Sense Environmental includes that in their standard service. It is a sign that the contractor stands behind their work. If you are shopping for a contractor, ask whether they offer that guarantee and what it covers.

Materials and Equipment Matter

Not all fans are the same. The fan in a radon reduction system has to run continuously for years, often in an attic that gets above 120 degrees in the summer. Cheap fans fail quickly. RadonAway makes reliable fans designed for this exact purpose. Their RP series is common in residential installations. The pipe should be schedule 40 PVC, not the thinner stuff used for drainage. The sealant should be a polyurethane caulk, not silicone. Silicone does not bond well to concrete over the long term.

The sump pump in many basements is another entry point. If the sump pit is not sealed, radon can rise through the pump opening. A sealed sump cover with a gasket can stop that. In some houses, the radon reduction system ties directly into the sump pit, using it as the suction point. That works well if the pit is properly sealed and the pipe runs from the pit to the fan.



Radon-Resistant Construction for New Homes

If you are building a new house, you have a chance to prevent radon problems before they start. Radon-resistant construction is not expensive when done during the build. It involves laying a layer of gravel below the slab, placing a vapor barrier, and running a vent pipe from the gravel up through the roof. The system is passive until you add a fan, which is easy to do later if testing shows the levels are high. Some builders in St. Louis include this as standard. Others do not. It is worth asking about.

Maintenance and Long-Term Thinking

A radon reduction system needs very little maintenance, but it is not zero maintenance. The fan should run continuously. If you turn it off for more than a few hours, radon levels can climb back up. The manometer should show a steady reading. If the fluid level changes, that could mean a blockage or a fan failure. The outside vent cap should stay clear of snow, leaves, and bird nests. I check mine once in the spring and once in the fall. It takes about thirty seconds.

The EPA recommends retesting your home every two years, even if the system is working. Soil settles. Foundations shift. A crack that was sealed ten years ago might open up again. A radon test kit every couple of years is cheap insurance. If you see a rise, you can call a contractor to inspect the system and reseal any new gaps.

Health and Peace of Mind

The American Lung Association ranks radon as the second leading cause of lung cancer in the United States, after smoking. That is a serious statistic. But the fix is straightforward and proven. A well-designed radon reduction system brings indoor levels down to near outdoor levels, which is usually below 2 picocuries per liter. That is a huge reduction in long-term risk.

I have lived with a radon reduction system in my own home for over fifteen years. It runs quietly in the background, and I barely notice it. The only time I think about it is when I glance at the manometer during laundry or when I change the furnace filter. It gives me peace of mind that I would not trade for anything.

If you live in St. Louis and have not tested your home for radon, pick up a radon test kit this week. If the results come back high, call a qualified contractor. The cost of a system is a fraction of what you would spend on a new roof or a furnace, and the benefit is something you cannot put a price on.