

Why Sub-Slab Depressurization Remains the Gold Standard for Radon Control

When I first started working on radon mitigation systems in St. Louis, I remember pulling up to a house where the owner had tried everything, sealing cracks, caulking joints, even installing a passive vent pipe that did nothing. The radon test still showed levels above the EPA action guideline. That house needed a real solution, and it came down to one method that has proven itself over decades: sub-slab depressurization.

For anyone living in areas with elevated soil gas, especially here in St. Louis where the geology can be unpredictable, understanding how sub-slab depressurization works is the difference between a basement that feels safe and one that quietly exposes your family to radon entry. This is not a new technique, but it is the one that consistently works when installed and maintained correctly.

How Sub-Slab Depressurization Actually Works

The principle is simple, but the execution requires careful attention. A radon mitigation system using [sub-slab depressurization](#) creates negative pressure beneath the concrete slab of a home. That negative pressure draws soil gas, including radon, toward a suction pit, then up through a vent pipe and out through the roof, where it disperses harmlessly into the outdoor air. The key is that the system reverses the natural pressure difference that would otherwise pull radon into the living space.

In practice, this means drilling a hole through the slab, creating a small cavity or suction pit, and running a vent pipe from that pit up to a radon fan assembly. The fan, usually mounted in an attic or outside the home, maintains that negative pressure continuously. A manometer installed on the vent pipe gives you a visual check that the system is running properly. If the manometer shows the right reading, you know the sub-slab depressurization is active and doing its job.

One detail that often surprises homeowners is how critical the sealant work is. Even the best fan and piping cannot compensate for a poorly sealed slab. All cracks, gaps around utility penetrations, and the perimeter joint between the slab and the wall must be sealed. Otherwise, the negative pressure pulls air from inside the house instead of from beneath the slab, which reduces the system's effectiveness and wastes energy.

Why St. Louis Homes Need This Approach

St. Louis sits on a mix of limestone, glacial till, and clay soils that can trap radon gas and push it toward foundations. I have seen homes only a few blocks apart where one needs a serious mitigation system and the other is fine. That variability means a generic approach does not work. Sub-slab depressurization is flexible enough to handle different slab conditions, soil types, and foundation layouts.

Over the years, I have worked with Air Sense Environmental on many radon repair jobs across the region. One thing we have learned is that existing radon mitigation systems sometimes fail not because the concept is flawed, but because the fan replacement was overdue or the sub-slab piping had shifted. Regular inspection of the fan assembly, the manometer reading, and the condition of the sealant around the suction pit can catch problems early. A well-maintained radon mitigation system with sub-slab depressurization should run for years without trouble, but it does need occasional attention.

Another common issue I see is a radon fan that has been running nonstop for a decade and finally burns out. Fan replacement is straightforward for a technician, but it requires matching the correct fan size to the existing sub-slab depressurization system. Put in a fan that is too weak, and you lose negative pressure. Too strong, and you waste electricity and may pull too much conditioned air from the house. Proper sizing matters.

Testing Confirms the System Is Working

No radon mitigation system should be considered complete without a post-mitigation test. The EPA recommends waiting at least 24 hours after the system is running before starting the test, and the test itself should run for a minimum of 48 hours under closed-house conditions. This gives an accurate reading of whether the sub-slab depressurization is actually reducing radon levels to below the action threshold.

I have been on calls where a homeowner had a system installed years ago and never tested after installation. They assumed it was working. When we finally ran a radon testing, the levels were still elevated because the original installer had not sealed the slab properly. The sub-slab depressurization was pulling air from inside the basement, not from under the slab. A good sealant job and a proper suction pit would have solved it from the start.

Radon testing should also be repeated every few years, especially if you make changes to your home's foundation, add an addition, or notice that your manometer reading has changed. A sudden drop in the manometer fluid level often means a leak in the vent pipe or a failure in the fan assembly. Ignoring that sign can allow radon entry to resume without you knowing.

Comparing Sub-Slab Depressurization to Other Methods

There are other ways to reduce radon, such as sealing alone or block-wall depressurization, but none match the reliability of sub-slab depressurization for most homes. Sealing without active suction is rarely enough because radon can still seep through microscopic cracks in the concrete. Block-wall systems work for homes with hollow masonry walls, but they do not address the soil gas directly beneath the slab.

Sub-slab depressurization addresses the source. By creating negative pressure under the entire slab, it captures radon before it ever enters the living space. That is why it is the method recommended by the EPA for new construction and for retrofitting existing homes.

There are trade-offs, of course. The system requires electricity to run the radon fan, and the fan will eventually need replacement. The installation involves cutting into the slab, which can be messy. But for the vast majority of homes in St. Louis, the benefits far outweigh these minor inconveniences. A properly designed sub-slab depressurization system can reduce radon levels by 99% or more.

Maintenance Tips for Homeowners

If you already have a radon mitigation system, here are a few practical checks you can do yourself:

- Check the manometer monthly. If the fluid level changes, something is wrong.
- Listen to the radon fan. Unusual noise or vibration often signals wear.
- Inspect the vent pipe for damage, especially where it exits the roof.
- Look for cracks in the slab sealant, especially around utility lines.
- Schedule a professional inspection every few years.

When it comes time for repairs, call a company that specializes in radon mitigation. In St. Louis, Air Sense Environmental handles everything from radon repair to full system replacement. They understand the local soil conditions and know how to diagnose a failing sub-slab depressurization system quickly.

I have seen too many homeowners wait until the radon test comes back high before calling for help. By then, the family has been exposed for months or years. Regular inspection of your radon mitigation system is cheap insurance. A simple check of the manometer takes thirty seconds.

The Bottom Line

Sub-slab depressurization is not a flashy technology. It is a proven, workhorse method for controlling radon entry. It relies on basic physics, careful installation, and occasional

maintenance. For homes in St. Louis and similar regions, it remains the most effective way to protect indoor air quality from soil gas.

Whether you are installing a new system or maintaining an existing one, understanding how sub-slab depressurization works helps you make better decisions about radon fan selection, sealant quality, and when to call for professional help. And that knowledge, more than anything, keeps your home safe.