

Why Professional Radon Mitigation Installation Matters for Your Home

When I first moved to York County, radon was not something I gave much thought. It was just another item on the home inspection report, something about "elevated levels" and "recommended action." I figured I would crack a window or buy a fan. That naive assumption almost cost me my family's long-term health. Radon is a colorless, odorless gas that comes from the natural decay of uranium in the soil. It seeps into homes through gaps in the foundation, and over years of exposure, it becomes the second leading cause of lung cancer in the United States. The EPA recommends action when levels reach 4 picocuries per liter or higher. Many homes in this region test above that threshold.

What I learned through research and conversations with local experts like Dan Jenkins is that radon mitigation is not a do-it-yourself project. It is a precise engineering challenge that requires understanding how air moves through soil, how pressure differences work inside a building, and how to create a permanent barrier that keeps the gas out. Professional radon mitigation installation is the only reliable way to bring indoor radon levels down to safe, livable numbers. This article walks through what that process actually involves, why it works, and what homeowners should expect when they hire a qualified installer.



How Radon Gets Into Your Home

Radon enters a building primarily through the ground. The gas moves upward through soil pores and cracks in the concrete slab. It finds its way through sump pump openings, floor drains, gaps around pipes, and even the tiny spaces where the foundation meets the walls. In homes with a crawlspace, the gas can rise through the dirt floor or through openings in the subfloor. In basements, the concrete slab is rarely a perfect seal. Over time, hairline cracks develop, and the constant negative pressure inside the house relative to the soil below acts like a vacuum, pulling radon indoors.

This pressure difference is the key reason why simply opening windows is not enough. Ventilation can help temporarily, but it does not address the source. The only lasting solution is to intercept the gas before it enters the living space. That is where a properly designed mitigation system comes in.

The Core Method: Sub-Slab Depressurization

The most common and effective approach for homes with a concrete slab foundation is sub-slab depressurization. A technician drills a hole through the slab, usually in a basement or a

utility room, and digs a small pit in the gravel below. Into that pit goes a section of PVC pipe, which runs up through the slab and connects to a fan unit mounted either inside the basement or on the exterior wall. The fan creates a vacuum under the slab, drawing radon-laden soil gas into the pipe and venting it safely above the roofline, where it dilutes harmlessly into the outdoor air.



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For homes with a crawlspace, the approach shifts to active soil depressurization. In that case, a sealed membrane is laid over the dirt floor, and a pipe is inserted through the membrane into the soil below. The same fan-and-venting principle applies, but the membrane acts as an additional barrier, preventing the gas from rising into the crawlspace and then into the living areas above.

A key component that many homeowners overlook is the manometer. This small, U-shaped tube filled with colored liquid sits on the pipe above the fan. It shows the pressure difference between the inside of the pipe and the surrounding air. A properly installed system will show a steady liquid level on one side, indicating that the fan is working and the vacuum is holding. If the levels equalize, it means the fan has failed or the system has a leak. The manometer is your early warning system.

Sealing: The Unsung Hero

No [radon mitigation installation](#) can succeed without thorough sealing. The fan and pipe only handle the gas that reaches the suction point. The rest of the slab still has cracks, joints, and penetrations. Every gap where a utility line enters the foundation, every floor drain, every expansion joint must be sealed with a durable caulk or gasket. I have seen systems that tested well initially but failed months later because a single penetration was left unsealed. The gas simply found another path.

Sealing is not glamorous work. It involves crawling into tight spaces, cleaning old debris from cracks, and applying sealant carefully. But it is the difference between a system that reduces radon by 90 percent and one that barely moves the needle. A good installer will seal every visible gap before the fan ever turns on.

Testing Before and After

Before any mitigation work begins, a baseline measurement is essential. The most common method is a short-term radon test using a charcoal canister. You place the canister in the lowest livable level of the home, leave it for two to seven days, then send it to a lab for analysis. These tests are inexpensive and provide a snapshot of current conditions. For a more detailed picture, a continuous radon monitor can track levels hour by hour, showing spikes that might occur during weather changes or when the HVAC system cycles.

After the system is installed, the real validation happens: a post-mitigation test. This is a second short-term radon test conducted under the same conditions as the first. The goal is to achieve a level below 4 picocuries per liter, and ideally much lower. Many professional installations bring levels down to 1 or 2 pCi/L. I have seen systems that dropped from 25 pCi/L to 0.8 pCi/L after a proper radon mitigation installation. That is not luck. That is careful design and execution.



Dan Jenkins, who runs a local mitigation service in York County, emphasizes that the post-mitigation test is non-negotiable. "We do not call a job done until the numbers come back

clean," he told me. "And we provide a radon system warranty that covers parts and labor for five years, so the homeowner has peace of mind." That warranty typically includes an annual check of the manometer and fan unit, plus a free retest if the homeowner suspects a problem.

What to Look for in an Installer

Not all radon mitigation companies are created equal. Some will drill a hole, drop in a pipe, mount a fan, and call it a day. A professional radon mitigation installation involves far more attention to detail. Here are a few things to look for:

- Proper placement of the suction point. The pipe should be located near the center of the slab or where the highest radon concentration was measured.
- Use of schedule 40 PVC pipe, which is strong enough to withstand soil pressure and weather exposure.
- A fan unit rated for continuous operation, ideally one that is energy-efficient and quiet.
- Clear documentation of the pre- and post-mitigation test results.
- A written radon system warranty that covers parts, labor, and retesting for at least three to five years.

Also ask whether the installer carries liability insurance and whether they are certified by the National Radon Proficiency Program or the National Radon Safety Board. These certifications require ongoing education and adherence to industry standards. They are not just letters on a business card. They represent a commitment to doing the job right.

Common Misconceptions

One of the biggest myths I hear is that radon mitigation is a one-size-fits-all solution. In reality, every home is different. The soil type, the depth of the gravel bed under the slab, the presence of a crawlspace or basement, even the local water table all affect how the system should be designed. A home built on sandy soil may need a different fan size than one built on clay. A home with a sump pump may require a special adapter to keep the system sealed while still allowing the pump to function.

Another misconception is that radon mitigation is prohibitively expensive. While the cost varies, a typical installation for a 2,000-square-foot home in York County runs between \$1,000 and \$2,500. That includes the fan unit, PVC pipe, sealing materials, and labor. Compare that to the cost of a single health scare or the price of replacing a furnace that has been damaged by radon decay products. The investment is small relative to the protection it provides.



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Final Thoughts

Radon is a serious problem, but it is also a solvable one. The technology is proven, the methods are standardized, and the results are measurable. What matters most is choosing a qualified professional who will take the time to do the job correctly. A hasty radon mitigation installation can leave you with a false sense of security, while a well-planned system will protect your home for decades.

If you live in York County or anywhere in south-central Pennsylvania, you owe it to yourself and your family to get your home tested. If the numbers come back high, do not panic. Call someone who knows what they are doing. Ask questions. Demand a post-mitigation test. And

make sure the system includes a manometer so you can monitor its performance over time. Clean air is not a luxury. It is a basic requirement for a healthy home.