What to Expect During a Professional Radon System Installation

When you buy a home in south-central Pennsylvania, a radon test is usually part of the deal. If the results come back above 4.0 pCi/L, the EPA and the Pennsylvania Department of Environmental Protection both recommend installing a mitigation system. That recommendation is straightforward on paper but the actual process of a radon system installation involves several steps that most homeowners never see coming.

I have worked on radon mitigation projects across York and Adams counties for more than a decade. Every house presents its own set of challenges. The foundation type, the soil beneath it, the layout of the finished basement, and even the location of the water heater all affect how a system gets designed. Knowing what happens during a radon system installation can save you time, money, and a few headaches.

Step One: Diagnostic Testing Before Any Work Begins

A good installation does not start with a drill. It starts with a smoke test or a chemical tracer test. The contractor places a small smoke emitter near the sump hole or a floor crack and watches how the air moves. If the smoke pulls downward or stays in place, the soil suction approach will work. If the smoke drifts sideways toward a wall, the crew may need to seal a different part of the slab first.

This diagnostic phase also includes measuring the baseline radon level under the slab with a continuous monitor. The numbers tell the contractor whether a single suction point will be enough or whether the house needs multiple points. I have seen houses in York County where one three-inch pipe dropped the level from 18 pCi/L to 1.2 pCi/L. I have also seen houses in Adams County where a single point barely moved the needle because of an unusual gravel layer under the foundation. The diagnostics are not optional. They are the difference between a system that works and one that just makes noise.

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Site Preparation and Material Selection

Once the diagnostic test confirms the approach, the crew moves to material staging. The standard system uses three- or four-inch PVC schedule 40 pipe, a fan rated for continuous outdoor use, and a U-tube manometer to show the system is running. The pipe must be rigid enough to handle the constant negative pressure without collapsing. Some contractors try to

use thinner wall pipe to save money but that often leads to sagging joints after a few seasons of freeze-thaw cycles.



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The fan selection matters more than most homeowners realize. A fan that is too small will not pull enough suction to lower the radon level. A fan that is too large can create excessive noise and may cause the system to short-cycle, reducing its lifespan. The best installations use a fan matched to the specific suction curve of the house. That is why a reputable contractor will not quote a price over the phone without seeing the property. Every house is different.

The Actual Installation: Cutting, Running, and Sealing

The core of a radon system installation involves cutting a hole in the concrete slab, usually in a utility area or a closet, and digging a small cavity beneath it. The crew vacuums out loose debris and places a short section of pipe into the hole. The pipe then runs upward, either inside a wall cavity or along the exterior, to a point above the roofline. The fan mounts in the attic or on the outside wall, depending on local code and the roof pitch.

Sealing is the part that separates good work from sloppy work. Every joint must be solvent-welded, not just friction-fitted. The hole in the slab must be sealed with hydraulic cement or a non-shrink grout. A gap as thin as a credit card can bleed enough soil gas to keep the indoor radon level above the action threshold. I have seen systems with brand new fans fail because the crew skipped the sealant around the conduit penetration.

After the pipe is run and the fan is mounted, the crew installs the manometer and a labeled disconnect switch. The manometer lets you check the system status at a glance. If the fluid level is even, the system is pulling suction. If the fluid is uneven or one side is empty, the fan has stopped or the pipe has a leak. A good installer will also label the exterior pipe so future roofers or painters do not mistake it for a vent stack and cut it off.

Post-Installation Testing and Verification

A professional radon system installation does not end when the fan starts spinning. The contractor should place a continuous radon monitor in the lowest livable area for at least 48 hours to confirm the system brings the level below 4.0 pCi/L. Some contractors run the test for a full week to account for weather changes. Barometric pressure and rainfall can affect radon entry rates. A system that passes a two-day test in dry weather might struggle during a week of steady rain if the soil sealing was not thorough.



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In Pennsylvania, the DEP recommends that homeowners retest every two years even with a working system. Fans wear out, seals degrade, and soil conditions shift. A manometer tells you the fan is running but it does not tell you the radon level. Only a test can do that.

Common Mistakes Homeowners Make

I have seen three mistakes more often than any others. First, homeowners try to save money by installing the system themselves without diagnostic testing. They drill a hole, drop in a pipe, and hope for the best. Sometimes it works but often it does not and they end up paying a contractor twice as much to fix it. Second, they choose the cheapest fan they can find online. A fan that costs forty dollars will probably fail within a year. A quality fan costs more but it runs for five to seven years with no issues. Third, they ignore the post-installation test. They assume that because the fan is running, the radon is gone. That assumption can be dangerous.

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One other thing that surprises homeowners is the noise. An exterior fan mounted on a brick wall can transmit vibration into the house. A well-designed system uses rubber isolation mounts and a muffler section of pipe to dampen the sound. If the installer does not include those details, ask for them. A quiet system is a system you will not regret having.

Cost and Timeline Realities

A typical radon system installation in York or Adams County runs between $1,200 and $2,500, depending on the complexity of the routing and the type of fan. Most installations take one day. If the crew hits rock or encounters a foundation drain that needs rerouting, it can stretch to two days. The cost includes the diagnostic visit, the materials, the labor, and the post-installation test. Some contractors also include a one-year warranty on the fan and a five-year warranty on the piping. Ask about that before you sign the contract.

Financing is sometimes available through state programs or local grants. The Pennsylvania Department of Environmental Protection occasionally offers low-interest loans for radon mitigation in certain counties. It is worth checking their website or calling your county health department. Even without assistance, the cost of a system is far less than the long-term health risk of living with elevated radon.



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When to Call for a Replacement or Upgrade

If you already have a system but the manometer shows no suction, or if your radon test comes back high even with the fan running, the system may need a replacement fan or a full redesign. A radon system installation is not a permanent fix. Fans wear out. Pipes can crack. Soil conditions can change after a major renovation or a new driveway installation. If your system is more than five years old and has never been serviced, it is worth having a contractor inspect it.

York PA Radon Pros, located at 867 Clare Ln, York, PA 17402, USA, serves York and Adams County as a local resource for radon testing, mitigation, and fan replacement, offering trusted contractor recommendations and DEP-backed data. You can reach them at +1 717-807-5245 for a consultation or a system evaluation.