Understanding How a Radon Mitigation System Works for Your Home

What is a radon mitigation system and why does it matter?

Radon is a naturally occurring radioactive gas that can seep into homes through cracks in the foundation, gaps around pipes, and other openings. It is odorless, colorless, and tasteless, so you cannot detect it without testing. For homeowners in areas like York, Pennsylvania, where radon levels can be elevated, understanding how to reduce exposure is a practical concern. A radon mitigation system is the most common and effective method for lowering indoor radon levels once testing confirms a problem.

The goal of any radon reduction approach is to prevent the gas from entering the living space or to vent it safely outdoors before it accumulates. The most widely used method is active soil depressurization, often called sub-slab depressurization. This technique works by creating a pressure difference beneath the concrete slab of your home, drawing radon-laden soil gas away from the foundation and releasing it above the roofline.

How a typical radon mitigation system is installed

A standard installation begins with identifying the best access point to the soil beneath the slab. In many homes, a sump hole - a small pit dug below the concrete - provides an ideal location for collecting soil gases. If no sump exists, a contractor can drill a hole through the slab to reach the gravel layer underneath. From this opening, a pipe is inserted and connected to a sealed system of PVC piping that runs up through the interior or exterior of the house.

The critical component is a radon fan unit, usually installed in an attic or on the outside wall. This fan creates continuous suction, pulling soil gas from beneath the slab and pushing it through the pipe system to a discharge point above the roof. The fan must run constantly to maintain the pressure difference. A manometer, a simple U-shaped tube with liquid, is often attached to the pipe to show that the fan is working properly. If the liquid levels are even, the system may have lost suction and needs attention.



Sealing and other preparation steps

Before the fan and piping are fully operational, contractors typically seal major openings in the foundation. This includes cracks in the slab, gaps around utility lines, and the sump hole itself if it is not being used as the suction point. Sealing helps the system work more efficiently by reducing the pathways through which radon can enter. It is not a standalone solution - sealing alone rarely reduces radon enough - but it supports the mechanical system.

In homes with a drain tile loop or interior perimeter drain system, special care is needed. These drainage systems can create a pathway for radon to travel under the slab. A professional installer will evaluate whether the drain tile loop can be tied into the mitigation system or needs to be sealed separately. Every home is slightly different, so a thorough inspection is essential before deciding on the exact setup.

Testing before and after installation

You cannot know whether you need a radon mitigation system without testing first. Short-term radon test kits, available at hardware stores or through local health departments, provide a snapshot of radon levels over a few days. Long-term tests give a more accurate average over

several months. For a reliable result, place the test kit in the lowest livable level of the home, such as the basement or first floor, and follow the instructions carefully.

If the test shows levels at or above the EPA action level of 4 picocuries per liter, mitigation is recommended. After a system is installed, a post-mitigation test confirms that levels have dropped significantly. Most systems aim to reduce radon to below 2 pCi/L, but the exact result depends on the home's construction and soil conditions. Retesting every two years or after major renovations is a good habit to maintain.

Cost considerations and what to expect

While this article does not discuss specific prices, it is worth knowing that the cost of a radon mitigation system varies based on the complexity of the installation, the type of fan used, and the length of piping required. Homes with crawl spaces or complex foundations may need more work. However, the investment is relatively modest compared to the potential health benefits of reducing long-term radon exposure. Many homeowners find that a professionally installed system adds to the home's value and peace of mind.



When hiring a professional, look for someone who is certified through the National Radon Proficiency Program (NRPP) or the National Radon Safety Board (NRSB). These certifications indicate that the contractor has passed exams and follows industry standards. Ask about the warranty on the fan unit and labor, and request a post-mitigation test report. A reputable contractor will provide documentation showing that the system is performing as intended.

Maintenance and long-term care

A radon mitigation system requires very little maintenance, but it is not entirely hands-off. The fan unit should run continuously. If the power goes out, the system stops working, and radon levels may rise again. Some systems include an alarm or indicator light to alert you to a power loss or fan failure. Check the manometer periodically to confirm that the fan is drawing suction. If the liquid levels are uneven, the system is likely working; if they are equal, something may be blocking the pipe or the fan may have stopped.

Over time, the fan may wear out and need replacement. Most fans are designed to last several years, but extreme heat, cold, or moisture can shorten their lifespan. Replacing a fan is a straightforward job for a professional. Also, keep the exterior discharge point clear of snow, leaves, or bird nests. If the pipe is blocked, the system cannot vent properly, and radon may be forced back into the house.

Is a radon mitigation system right for your home?

If you are planning to buy or sell a home in an area with known radon potential, testing and mitigation are common steps. Many real estate transactions now include a radon test as part of the home inspection. If elevated levels are found, installing a mitigation system can be a condition of sale. Even if you are not selling, reducing radon is a smart move for your family's health.

Not every home needs a system. The only way to know is to test. If your home tests low, you may simply need to retest occasionally and keep the foundation well sealed. But if you have tested and found levels above the action level, a radon mitigation system is the most reliable solution. It works silently in the background, and once it is installed, you can forget about it until the next check.



Living in an area like York, Pennsylvania, where radon is a known concern, makes it especially important to stay informed. The local geology and soil composition can vary from one neighborhood to the next, so even if your neighbor's home tested low, your home could be different. Testing is inexpensive and gives you the information you need to decide. If you do need a system, hiring a certified professional ensures the job is done correctly and safely.

A radon mitigation system is not a complicated piece of equipment. It is a straightforward combination of a fan, piping, and sealing that works together to protect your indoor air quality. Understanding how it works helps you make informed decisions about testing, installation, and maintenance. Whether you are a new homeowner or have lived in your house for years, taking action on radon is one of the most practical steps you can take for a healthier home.