

What to Expect When You're Installing Spray Foam Insulation

HOMEOWNER'S GUIDE



Evaluating Your Home, Your Needs, and Your Preferences



Whether they are looking to remodel their existing home or properly outfit a new construction, homeowners are always faced with question of insulation. Different types of insulation offer different benefits—some more than others—that affect the environment, personal finances, and quality of life. So, the decision boils down to what type of insulation to use, and how best to have it installed.

In this homeowner's guide we will discuss why and how millions of homeowners are turning to spray polyurethane foam insulation to seal and insulate their homes. More importantly, we will discuss how to intelligently choose a spray foam contractor who will install a proper SPF insulation application, and walk you through the entire process.

Considering Your Insulation Options

Traditional Insulation Materials: Fiberglass and Cellulose

Fiberglass, currently the most popular insulating material on the market, has typical R-values of 3.5 per inch, and cellulose, often cited as the oldest insulating material used in home construction, has typical R-values of 3.8 per inch. Both materials are relatively inexpensive insulators, but both suffer from a few weaknesses:

- They settle or sag over time, resulting in reduced R-values.
- They do not offer intrinsic sealing properties and must be installed with additional sealing materials
- They do not offer supplementary physical properties like structural rigidity and soundproofing
- They lose thermal resistance (R-value) when wet, as water readily conducts heat



Cellulose



Fiberglass

Modern Insulation Technology: Spray Polyurethane Foam

Insulating Properties (High R-Value)

SPF boasts the highest R-value per inch of any other commercial material—upwards of R-7.0, compared with fiberglass at R-3.5 (SPF R-values vary to some degree by type and manufacturer). A higher R-value enables foam to provide more thermal resistance with less material, making your home more comfortable and less expensive to heat in the winter, and cool in the summer.

Preventing Air Infiltration

U.S. Department of Energy (DOE) studies have shown that as much as 40% of a building's total energy loss is due to air infiltration. Air infiltrates the home through gaps and cracks in walls, sockets, windows, and doorways. Traditional fiberglass insulation does not seal the perimeter of the stud and wall cavities, thereby facilitating air infiltration. SPF adheres to the walls and floors and fills stud cavities to create a tight seal and insulating barrier that stops this air leakage.

Reducing Moisture and Mold

Mold growth frequently occurs in the presence of excessive heat and moisture accumulation. While there is no feasible way to completely eliminate mold and mold spores indoors, the most effective way to control indoor mold growth is to control moisture. This is where spray foam can be utilized effectively as an air and vapor barrier. When applied, SPF seals the cracks, gaps and holes in the building's structure and sheathing to create a tight space by reducing air and moisture flow from infiltration and exfiltration.

Enhancing Building Stability

Since SPF can completely fill stud cavities, it creates a seamless and monolithic wall assembly. Factoring in its rigidity, closed-cell SPF applied to the walls of a home enhances overall building stability. In fact, NAHB research has demonstrated that walls incorporating closed-cell spray foam increase the racking strength, or resistance to shearing, of walls by 75 to 200 percent.

Deadening Sound

SPF can function as a sound barrier, making a home acoustically tighter and more private from room to room. Open-cell foams in particular are great for blocking the transmission of sound waves.



Improving Indoor Comfort

A more comfortable interior environment can be achieved with spray foam insulation. SPF's sealing properties can result in a reduction or elimination of drafts, while improved temperature regulation is derived from SPF's insulating properties. Additionally, SPF's air and vapor barrier properties can significantly control the presence of allergens and moisture in the air. Finally, spray foam's sound-deadening characteristics can introduce a level of indoor tranquility unattainable with traditional insulating materials.

Lowering Energy Bills

As stated above, upwards of 40% or more of a home's energy loss is due to air infiltration, which makes it the leading contributor to higher energy consumption/expenses. Utilizing spray foam insulation's sealing properties can effectively eliminate air infiltration, which can thereby reduce both a home's energy consumption and a homeowner's energy bills. SPF's insulating properties contribute to more effective temperature regulation, which reduces the amount of time air conditioning and heating units are on, thereby further lowering monthly energy bills.





Working with a Spray Foam Contractor

When homeowners have decided to move forward with installing spray foam installation in their homes or buildings, their first consideration should be finding a professional. SPF insulation applications are complex processes that shouldn't be undertaken without proper experience and training.

Experience and Background

It's prudent to ask an SPF contractor about their past experience, such as:

- How many years they've been in the industry
- How many years they've actually been spraying foam
- How many projects they've completed
- What types of projects they've completed
- Whether they can provide any testimonials or references
- Whether they work with BPI Certified Energy Auditors or HERS Rater
- Whether they are a licensed contractor, and are bonded and insured
- Whether they are SPFA Certified

Knowledge

Homeowners should ask a spray foam contractor about their knowledge base of SPF itself:

- General properties and benefits
- Safe handling, storage, and disposal practices
- Which type of foam and application(s) are recommended their climate
- Which type of foam and application(s) are recommended their home
- Which type and/or brand of foam does the contractor typically use

It is always a good idea to verify a contractor's answers by calling other SPF installers in the area or visiting SprayFoam.com's Homeowner's Guide in order to confirm accuracy or identify inconsistencies.

Certification

The Spray Polyurethane Foam Alliance's (SPFA) recently launched Professional Certification Program (PCP) meets the internationally recognized ANSI/ISO 17024 Standard and sets a new benchmark for contractor qualifications. Homeowners can verify a contractor's certification by asking to view their PCP card. The cards are detailed as followed, in increasing order of certification:

- Red Card: SPF Assistant (not certified to apply spray foam)
- Yellow Card: SPF Installer
- Green Card: SPF Master Installer
- Blue Card: SPF Project Manager

Training

Contractors that haven't yet gone through the SPFA PCP courses may be trained and/or authorized by individual spray foam manufacturers to install their SPF products. The training is typically conducted by the manufacturer, but in certain cases can be conducted by authorized training facilities. Consumers should find out:

- When the training or authorization occurred
- The scope of the training or authorization
- Whether the training or authorization was conducted by a foam manufacturer or an authorized training facility
- What authorizations or licenses the training offered
- Whether authorizations or licenses are current

Equipment

They say a craftsman is only as good as his tools, and make no mistake—applying SPF insulation is a craft. Keeping that in mind, it's best to ask a prospective installer about their tools—their equipment—by asking about:

- How many rigs they have
- What kind(s) of rig(s) they have (towable, box truck, van, etc.)
- How long they've had it/them
- How often they perform maintenance
- How many spray guns
- How clean and tidy it/they are

Of course, much of these questions can be verified with a quick inspection of the installer's equipment when they arrive on the job site.

Project-Specific Questions

- *Do I need a contract?* It's typically a good idea to enter into a contract so both parties know what is expected of each other before, during, and after the spray foam installation. Some jurisdictions may require contracts for agreements that cost more than an established threshold. The agreement might include: price, specific product(s) to be installed, length of the project, specific start and end dates, reentry time, cleanup, disposal, and any statement of warranty, if applicable.
 - o Price
 - o Manufacturer or systems house
 - o Open-cell or closed-cell
 - o Density
 - o Specified thickness(es)
 - Outline how this will be verified
 - Outline action plan if nominal thickness is other than specified
 - o Length of the project
 - o Specific start and end dates
 - o Reentry time
 - o Cleanup and disposal
 - o Any statement of warranty, if applicable
- *Do I need a permit?* Typically, making substantial changes to a structure requires a building permit from the local building authority, be it a city or county. Although contractors will often arrange the pulling of permits, it is the responsibility of the homeowner to ensure the proper permits are in place before proceeding with any construction initiative. Your contractor should be well aware of any and all laws regarding these issues. Additionally, it is important that the contractor post a SPF installation certificate, which details exactly what is being installed, in a clearly visible area.



Open-cell spray foam



Closed-cell spray foam

Knowing the Product: Spray Foam Insulation

Open-Cell Vs. Closed-Cell

When it comes time to actually put a spray foam product in your home or commercial building, you and your contractor must decide on whether 0.5 lb./cu. ft. (pcf) open-cell foam or 2.0 pcf closed-cell foam will be installed. The decision makes a big difference in cost, application methods, and performance, so it begs the question: what is the difference between open-cell and closed-cell polyurethane foams?

Open-cell foam, typically 0.5 pcf, consists of tiny cells that are broken, with air filling the “open” space inside the material. This makes the foam softer-feeling than closed-cell foam. Closed-cell foam, typically 1.7-2.0 pcf, differs in that all of its tiny foam cells are tightly-packed, fully encapsulated, and filled with a gas that helps the foam rise, expand, and function as a greater insulator.

The advantages of closed-cell foam, compared to open-cell foam, include increased strength, higher R-value, and greater resistance to the leakage of air and water vapor. The disadvantage of the closed-cell foam is that it is denser, meaning more material is used per unit volume, and so it's more expensive than open-cell foam.

Both types of foam are commonly used in most building applications and the choice for which to use can depend on many of the factors discussed above. For example, closed-cell foam would be a good choice where small framing sizes need the greatest R-value per inch possible. Conversely, some foam types are inappropriate in specific applications. For example, you typically would not use open-cell foam below grade.

The type of foam being used in your building or home is always a good issue to discuss with your spray foam contractor up front, before the job starts.

High-Pressure vs. Low-Pressure SPF

Spray-applied polyurethane foam can be divided into two main application categories: high-pressure (HP) and low-pressure (LP). HP SPF components are usually stored in 55-gallon drums and applied at upwards of 2,000 psi, while LP SPF components are usually stored in smaller tanks or kits and applied at roughly 200 psi.

There is a considerable difference in equipment for each type of application. HP SPF requires the use of large mobile spray rigs, which consist of towable trailers or box trucks that house the heavy-duty equipment necessary to apply the material at high pressures. LP SPF, on the other hand, can be applied with more compact, portable equipment that can be housed in a commercial van or the bed of a pickup truck.

Beyond equipment, HP and LP SPF differ by how much material is installed, and for what purpose. HP SPF is applied in larger projects that entail insulating, for example, an entire attic or the exterior walls of a home. HP SPF can be applied in large volumes, so it is more efficient for larger projects. For smaller projects, like air-sealing the building envelope or encapsulating a crawlspace, it would be overkill to use HP equipment and so LP SPF is implemented.

There are other differences between HP and LP SPF with regard to safety, and these differences are detailed in the Reentry Time section below.



Thermal & Ignition Barriers

Spray foam installation must be installed in accordance with proper fire protective methods and materials, as defined by applicable building codes. Basically, SPF insulation must be separated from living spaces by a thermal barrier, or in special cases, an ignition barrier. Of the two, a thermal barrier provides for a more robust separation of foam from living space.

In most cases, SPF insulation will be covered by drywall, which is a standard, or prescriptive, thermal barrier defined by code. In situations where SPF insulation won't be covered by drywall, such as the roofline of a readily accessed attic, it must be separated from living spaces by an approved thermal barrier coating. In other situations where SPF insulation is installed in restricted-access areas, like crawlspaces, it can be separated from interior spaces by an ignition barrier coating.

Homeowners should be aware that some SPF insulation products have passed testing criteria to permit installation without an ignition barrier coating. To be clear, this means a particular foam product can be installed without an ignition barrier in areas that would otherwise require it, but does not mean that same foam can be installed without a thermal barrier in areas that require it. In fact, no spray foam insulation product can be installed without a thermal barrier in areas that require it.

In order to verify your insulation application is being properly installed, it's best to discuss with your installer which building codes pertain to your insulation application, that is, whether a thermal or ignition barrier, or both, is required. Foam manufacturers are also good resources for building code information, as they are typically well versed in the codes that pertain to their products.

Material Safety

Because spray polyurethane foam is a product that is produced on-site—which is to say, in the home where it's being installed—it's critical that homeowners be informed about the safety of not only the end product, but also the two components used to produce it.

Homeowners should ask their contractor for Material Safety Data Sheets (MSDS) for the products being installed, prior to the installation. Any questions that arise should be posed to the contractor before the project starts.

Also, homeowners should obtain product literature directly from the components manufacturer to be informed about the safety and product characteristics of the specific brand of spray foam being installed in their homes. These documents can be easily obtained via the manufacturer's website.

Additionally, the EPA provides extensive resources on spray foam safety. The organization's spray polyurethane foam portal covers topics like related health concerns, ventilation during an application, and reentry time after an application.

Marketing Language

Spray foam insulation is often touted as being a "green" building material, but what exactly does that mean? Generally speaking, SPF is green in the sense that its installation in residential structures contributes significantly to reducing the buildings' energy consumption requirements. The reduction in consumption directly translates to a decrease in the demand for fossil fuel energy sources used to power homes. In other words, spray foam helps homes use less greenhouse gas-emitting fossil fuels, thereby making it a green building material.

Additionally some brands of spray foam are formulated with renewable ingredients, thereby reducing the material's environmental impact during the SPF components' manufacturing process.

The Federal Trade Commission (FTC) has outlined best practices for marketing green products, including the avoidance of deceptive marketing claims. The FTC's "Green Guides," or Guides for the Use of Environmental Marketing Claims, is freely available for download from the commission's website.

Foam Pricing

A major point of concern is the overall quality of the foam installed. Consumers can be, and have been, misled about exactly what is being installed in their homes, and so they should be wary of project quotes that seem too good to be true.

For both types of spray foam, low bids could indicate that a contractor is either trying to get rid of old foam without suffering a total loss, or unable to properly price their job (neither situation is ideal). In the case of pricing for closed-cell foam, a low bid could indicate that a

contractor plans to install a layer of cheaper, less effective open-cell SPF topped with a thin layer of closed-cell SPF on top (a classic bait-and-switch).

As a protective measure against being duped, homeowners should obtain and compare several quotes to get a rough idea of the installation prices in their area. Additionally, homeowners should inform prospective contractors that an inspector will be taking core samples of the finished application in order to verify what was outlined in the bid is actually what was installed.

Savings, Rebates, and Tax Credits

Spray foam insulation can play a crucial role in improving the energy efficiency of homes. SPF's impact on energy usage not only translates to a reduction in a home's operating costs, but also may qualify homeowners for tax rebates, credits, or other incentives. It's worthwhile for a homeowner to ask prospective contractors about any and all incentives available in their area, or to specifically seek out contractors that advertise their willingness to work with homeowners in qualifying for incentives.

The Spray Foam Application Process

When it comes to performing the application, SPF contractors should walk a homeowner through the entire process, focusing the following discussion points.

Supervision

It is important to know who will be supervising the installation process. If it's not the contractor, but rather one of his or her employees, it is important to ask the same questions listed in the previous section regarding experience, knowledge, training, and certification.



Prep Work

For spray foam insulation applications, prep work primarily involves the management of overspray, which is the accumulation of airborne SPF particulates on surfaces in the vicinity of a spray application. Overspray protection entails sealing off spray areas with masking tape and plastic sheeting, as well as covering anything surfaces that cannot get covered in SPF overspray.

Another important aspect of preparing a spray area is the extinguishing of any and all ignition sources in the vicinity of the spray area. Ignition sources can include pilot lights and even workers smoking on the job site.



Spray Foam Overspray

Ventilation

Because of the fumes produced during the formation and curing of the foam, ventilation should be employed, being set up before the application begins. There are best practices for ventilation setups that depend on the location and situation of the area being sprayed. For instance, fans and flexible tubing might be used to expel SPF fumes from spray areas without immediately accessible windows. Also, be sure the ventilation termination is located in a safe spot, and not, say, pointing directly at your neighbor's open windows.

Non-Contact

Building occupants should not be present in the vicinity of the spray area while an SPF application is occurring. The contracting crew should be outfitted in proper Personal Protective Equipment (PPE) while foam is being sprayed. Also, any other workers on-site while an application is occurring should either be outfitted with the PPE described above, or avoid the spray area altogether.

Reentry Time

After spray foam has been applied, reentry time and cleanup become paramount. The spray foam contractor should be aware of, and should also inform the homeowner about, the cure time for the spray foam products that are used during the insulation application. Generally speaking, time to reentry is at least 24 hours for a high-pressure application and 60 minutes for a low-pressure application. The spray area should be sectioned off for the duration of the cure time, at which point the occupants or other workers are allowed to reenter the area.

Homeowners should keep in mind that cure time is dependent on several variables, some relating to the material itself, and others relating to environmental conditions. Similarly, the duration of the entire SPF application depends on what application is being performed, how large the spray area is, and how difficult the spray area is to access.

When properly installed, spray foam cures to an inert state and does not produce fumes. Should a homeowner find that odors are present after the expected cure time, they should contact their SPF contractor as soon as possible.

Cleanup and Disposal

When it comes to cleanup, the SPF application crew should properly dispose of any and all materials used for overspray protection, as well as empty foam material drums and other disposables.

It goes without saying that a newly insulated home should look the way it did before an insulation application, but this shouldn't only apply to the interior of a home. A fairly common occurrence for homes with siding is when SPF applied to exterior walls 'bleeds' through gaps in the assembly and becomes visible through gaps in the siding. Bleed-through is a double-edge sword in that it provides visual evidence that SPF is sealing all of the gaps in the building envelope of a home, but it is at the same time unsightly and can stain the siding if left for too long. To guard against bleed-through damage, homeowners should discuss the issue with the installer beforehand, and incorporate into a contract an action plan to deal with the issue, should it arise.

SPF Resources

The first place every homeowner should begin their search for a qualified spray foam insulation contractor is the SPF industry's number one website, SprayFoam.com. SprayFoam.com's directory listings are the most comprehensive in the industry. Homeowners can find contractors by location and services provided, in addition to finding what licenses and certifications contractors have. In fact, if you come across a spray foam contractor by other means and their company isn't listed on SprayFoam.com, you might want to ask why it isn't.

Additionally, homeowners can find out about spray foam manufacturers and the products they produce in SprayFoam.com's supplier directory listings. Furthermore, SprayFoam.com hosts numerous pages of general information about SPF insulation in its Homeowner portal.