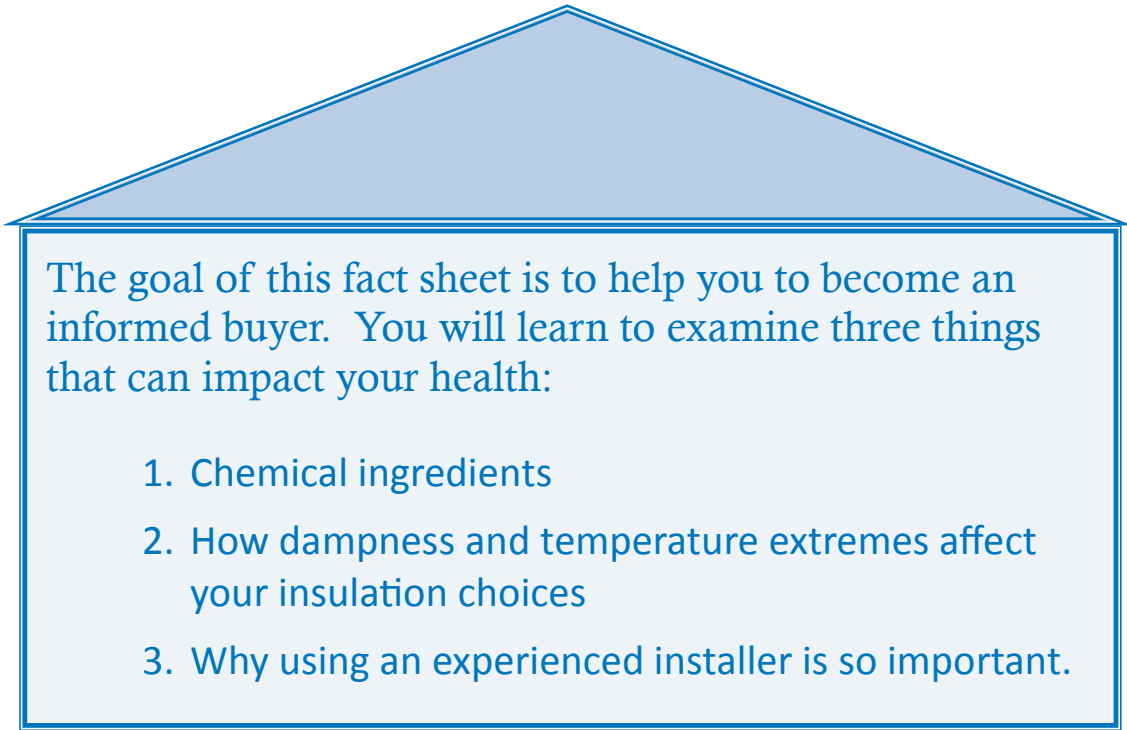


Insulation And Your Home: Health Considerations

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You may be thinking about adding new insulation to your existing home if your home is drafty, or you are looking for ways to save money on energy costs. There are many different types of insulation products in the market place, and many different ways to insulate a house.

The type of insulation you choose and the way it is installed may affect your health.



The goal of this fact sheet is to help you to become an informed buyer. You will learn to examine three things that can impact your health:

1. Chemical ingredients
2. How dampness and temperature extremes affect your insulation choices
3. Why using an experienced installer is so important.

This fact sheet focuses on the most commonly used insulation products in existing houses in the Northeast: synthetic polymer foams like spray polyurethane foam (SPF), mineral wool or fiberglass batts, and blown in cellulose. If you are building a new house or addition, there may be additional insulation products for you to consider.

Exposure to some insulation products can cause certain health effects if the product is mis-handled, mis-applied, or if the wrong product is used in certain environments. Common symptoms may include irritated, itchy, watery, or burning sensation of the eyes, nose, or throat, or itchy skin or skin rashes. Occasionally, some people report breathing difficulties, especially if they are asthmatic or have other breathing disorders. Rarely, some people have reported symptoms like nausea, headache, and confusion/difficulty concentrating. Sometimes there is an unpleasant odor that does not go away; in some of those cases, people have found it difficult to stay in the house.

How You Can Become Exposed

There are two main ways that you can become exposed to insulation:

Breathing chemical ingredients in the air

This is usually the result of chemical off-gassing. A small amount of off-gassing is normal. It should go away within a few days. If it doesn't, there may be a problem with the insulation or the way it was installed.

Breathing or skin contact with insulation dusts

There is usually a fair amount of dust generated by cutting dried foam or by simply handling loose, fluffy cellulose, or fiberglass, which can shed tiny pieces of glass that can be itchy. The insulation contractor should clean thoroughly after they are finished. This includes using a vacuum with a HEPA filter to pick up the dust. This should be done before the household members come back home.

1. Ingredients

Many building materials including thermal insulation contain fire retardants. Certain classes of insulation products may also contain chemical additives such as colorants, blowing agents, catalysts, and binding agents. Finding out what is in the insulation may influence your choices. If you or any household members are sensitive to any of these chemical ingredients, you may choose to look for a different formulation or type of insulation.

To find out what chemicals are in the insulation product under consideration, go to the manufacturer's website and download a copy of the Material Safety Data Sheet (MSDS). Manufacturers are required to list ingredients and quantities, as long as they are not proprietary ingredients. You can also download a product information sheet (also called a sell sheet or cut sheet). Here are some of the chemical ingredients you might see.

Formaldehyde

- ♦ Can cause eye, nose and mouth irritation in sensitive people
- ♦ Can cause respiratory problems including acting as an asthma trigger
- ♦ Off-gassing is increased in hot, damp environments
- ♦ Found in some fiberglass insulation products
- ♦ Main component in Urea Formaldehyde Foam Insulation (UFFI)- improper installation in 1970's caused formaldehyde

off-gassing and respiratory complaints, leading to a widespread UFFI ban in the US and Canada.

Fire Retardants

Protecting your home from fire is important. Codes require fire retardants in most types of thermal insulation.

Foam Insulation Products:

Certain fire retarding chemicals are routinely added to flexible and rigid foams. Some of these chemicals do not bind to the finished insulation material. They are continuously released into the environment throughout the life cycle of insulation. Some have been implicated in disrupting normal thyroid hormone function, nervous system development, and are potentially carcinogenic.

Cellulose Insulation:

Ammonium sulfate and boric acid are fire retardants commonly found in cellulose insulation. Occasionally, the ammonium sulfate can off-gas and produce an odor. In damp environments, it can also form corrosive byproducts that can degrade metal that it comes in contact with. This appears to be more of a concern in hot, high humidity environments like the southern part of the US. It is possible to purchase an all-borate cellulose product. It

may be more expensive than the borate-ammonium sulfate mix, but may release fewer odors.

Catalysts

Catalysts are added to the mix of ingredients in foam insulation products to enable the chemical reaction to occur to make the foam. Some catalysts are made with a class of chemicals called amines. These can off-gas and produce a fishy or sickly sweet odor if the foam does not harden or cure properly, and this off-gassing can continue for many weeks. The resultant odor has made some people ill.

2. Environmental Conditions

Your choices for types of insulation should be guided by which area of the house you plan on insulating.

Attics:

If you plan on adding insulation to your home, you can realize the biggest energy savings by insulating your attic. Common attic insulation choices include loose fill cellulose, SPF, and mineral wool/fiberglass batts. Attics can present challenges because of the large variations in temperature in the Northeast. That and moisture will narrow types of insulation suitable for attics. A cost effective approach is to first seal floor



penetrations with foam, then cover the floor with cellulose or batt type insulation.

Temperature Extremes:

Attics get both very hot and very cold in the Northeast. If you choose spray foam to insulate the attic, make sure that the specific SPF product used is designed to withstand large temperature swings. Closed cell SPF is a good choice for Northeast attics because of insulating and vapor retarding properties. Manufacturers usually make a number of formulations. Check with them to ensure the right one of their products is being used for your environment. If not, there could be problems with curing, leading to off-gassing, unpleasant odors, and possible health related effects.

Vapor Barriers-Not Always Needed

If mineral wool/fiberglass batts are chosen, they can be purchased with a variety of backing materials like kraft paper and reflective foil. These backings act as a vapor barrier.

Before buying, check with a knowledgeable source to see if a vapor barrier is indicated for your area, and if so, make sure that the backing is facing towards the living space. Otherwise, you could end up with a mold problem in the attic.



Exterior wall -Fiberglass batts between studs, vapor barrier facing living space.

Ventilation

It is important to maintain air flow through the attic space to prevent moisture accumulation. When installing any type of insulation in the attic, allow for natural air

flow through gable and/or ridge vents and through soffits by adding baffles in rafter bays.

Basements & Crawl Spaces

Many of the same principals apply to basements and crawl spaces. Humidity will dictate the type of insulation that will work in the space. Certain types of SPF should not be used in damp basements or crawl spaces, because they will not cure properly. This can lead to extended periods of off-gassing (weeks to months) , resulting in odors and possible health impacts in some people. Check with the manufacturer to find out if the specific formulation you are interested in is appropriate for your basement.

Do not install anything with a vapor barrier (like mineral wool/fiberglass bats) without consulting with a knowledgeable person about the specifics of your space. If fiberglass batts or other vapor barriers are used, make sure the backing material/vapor barrier is facing towards the inside of the house to prevent moisture from accumulating.

It is ok to use fiberglass in dry basements, but it should not be used in crawlspaces under the house. Fiberglass subjected to dampness, humidity, or weather can become a dirt trap and breeding ground for bacteria and mold. Closed cell spray foam or rigid foam would be a better choice for crawl spaces where humidity/exposure to weather are concerns.

Side Wall Insulation

The most common choices for a retrofit job are injection foam or blown in cellulose. The installer will drill a series of horizontal holes from either the inside or outside. The insulation material is pumped into the wall cavity through the holes, and the holes are then plugged.

Before starting the insulation job, make sure there is no water getting into the wall cavity. If there is, find the source and fix it before insulating. As mentioned, moisture can affect the chemical components in the insulation. It is also important that the entire wall cavity is filled and there are no pockets or gaps without insulation. If there are, condensation could form when cold outside air hits an un-insulated pocket containing warmer air in the wall cavity. An experienced installer can reduce the chance of this occurring.

3. Quality and Knowledge Level of the Installer

This is probably the most important part of the equation. It is crucial to hire an installer who has a lot of experience with the particular type of insulation that you have chosen. Ask your installer what kind of training they have received. The ideal installer has received training from the manufacturer about their specific products, and follows manufacturer's instructions when prepping the area, mixing the product, and applying the product. Ask if he/she has any industry certifications or has taken training classes for installers.

It is advisable to choose an installer who has been in business for a long time. If you do have any problems, you want to be able to have them come back and work with you to resolve the problem. See page 6 for some common mistakes made by inexperienced installers.

Finally, be sure to hire someone who has insurance and is actively registered with the CT Department of Consumer Protection (DCP). Many good tips can be found in their publication, [*What to Look For in a Home Improvement Contractor*](#).

References & Links

Department of Energy

Insulation Types: <http://energy.gov/energysaver/articles/types-insulation>

R- Value Recommendations: http://web.ornl.gov/sci/roofs+walls/insulation/ins_16.html

Cellulose Insulation

Cellulose Insulation Manufacturers Association: <http://www.cellulose.org/>

Fiberglass & Mineral Wool Insulation

North American Insulation Manufacturers Association: <http://www.naima.org/index.php>

Spray Polyurethane Foam Insulation

Center for Polyurethanes Industry/Spray Foam Coalition: <http://spraypolyurethane.org/>

Environmental Protection Agency:

http://www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html

Green Building Advisor:

<http://www.greenbuildingadvisor.com/green-basics/spray-foam-insulation-open-and-closed-cell>

Minnesota Energy Tips:

Several Good Pieces About Insulation and More <http://mn.gov/commerce/energy/topics/resources/minnesota-energy-tips/>

Common Mistakes Made By Inexperienced Insulation Installers

These mistakes can create conditions that can impact your health

Spray Polyurethane Foam (SPF)	Cellulose (blown in)	Fiberglass Batts
Choosing wrong formulation for damp or temperature extremes	Failure to monitor the installation to prevent cellulose from being blown into the living space	Installing batts with the backing (vapor barrier) facing the wrong direction
Failure to follow manufacturer's instructions for mixing, holding temps, and how fast and thick each pass should be*	For damp- sprayed cellulose, adding too much water, which delays drying and does not permit formation of hard shell**	Installing fiberglass batts where it is too damp (like in crawl spaces under the house)
Not ventilating properly during job and hours after job is completed	*As specified by the manufacturer ** A common installation technique is to spray a damp slurry of cellulose into the space to be insulated. When the slurry dries, a hard shell forms, making it impervious to occasional moisture that may come into a building. If the slurry does not dry thoroughly after it is installed, the damp cellulose insulation can become moldy. Occasionally, the inks and other chemicals used to make this paper based product have been known to off-gas from damp cellulose insulation. The mold and chemical off-gassing may contribute to household occupant symptoms like respiratory problems (mold) or mild eye, nose, or throat irritation (chemical exposures).	
Failure to notify clients that they should not be present during spraying and for at least 24 hrs afterwards*		



Spray Polyurethane Foam



Cellulose is often sprayed over old fiberglass batts



Fiberglass batts—vapor barrier correctly facing towards living space

