

**HUNTSMAN**

Enriching lives through innovation

# Spray Polyurethane Foam Insulation

Creating Cost Effective, Energy Efficient, Green Buildings



# What is Spray Polyurethane Foam?



**Spray Polyurethane Foam (SPF)** is an insulation product that is spray-applied in situ at a building site. Two liquid components, MDI (A) and polyol blend (B) are mixed under pressure and sprayed onto a roof or wall cavity. The reacting liquids expand and solidify into a foam matrix creating a seamless seal. SPF adheres well to the area it is applied to, providing an air barrier that prevents thermal leaks.

## Types of SPF

Spray Foam comes in two forms:

**Closed-cell foam** (sometimes known as two-pound or medium density foam) has a high R-value of around 6 per inch. It acts as an air and vapor barrier. It also provides structural enhancement.

**Open-cell foam** (sometimes known as half-pound or low density foam) has an R-value of 3.6 per inch, and may act as an air barrier. It also acts as a noise absorber.



## The Only Complete Insulant

A building functions to protect its occupants against the exterior environment.

**Insulation** and **air-tightness** are two of the most important components of a building's protection against outside conditions.

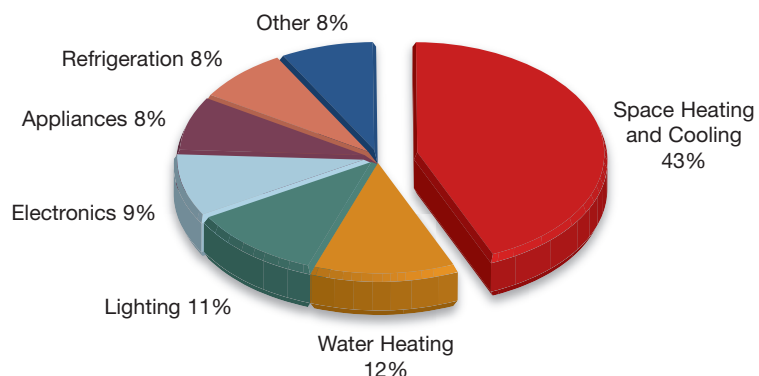
Building components interact as a system to control the flow of heat, air, moisture and sound into and out of a building. SPF is the only complete insulant that controls against these elements. With SPF, building owners have lower utility and maintenance bills, better health and a more comfortable interior environment.

**“Moisture poses the biggest threat to structural integrity and durability, accounting for up to 89% of damage in building envelopes”**

M.T. Bomberg and W.C. Brown, Construction Canada, 35(1), 1993

SPF as a Thermal Insulant	SPF as an Air Barrier	SPF as a Moisture Barrier	SPF as a Sound Barrier
<ul style="list-style-type: none"> <li>• High R-value</li> <li>• Does not settle or sag with time</li> <li>• Reduces or eliminates thermal bridging effect</li> </ul>	<ul style="list-style-type: none"> <li>• Low air permeance</li> <li>• Completely seals wall penetrations</li> <li>• Prevents drafts and hot-spots</li> </ul>	<ul style="list-style-type: none"> <li>• Prevents moisture penetration</li> <li>• Eliminates dewpoints in the wall cavity</li> <li>• Controls mold problems</li> </ul>	<ul style="list-style-type: none"> <li>• Air seals to absorb sound at varying frequencies</li> <li>• Dampens sound vibrations transmitted through solid materials</li> <li>• Facilitates walls and ceilings with STC 50, NRC 95</li> </ul>

## Homeowner Energy Cost Allocations



**“Air infiltration can account for 30% or more of a home’s heating and cooling costs.”**

U.S. Department of Energy

# SPF: The Right Choice for Commercial Buildings

SPF provides insulation, air and moisture protection for many different commercial building roof and wall configurations. SPF use allows for flexibility of building design, reducing overall maintenance costs, and can extend the lifespan of the building.

## Roofs

SPF insulation is ideal for roofs because it can be sprayed onto existing roofing material as a re-cover, or applied onto new substrates. SPF roofs are weather-proof, light-weight, durable, and require less maintenance compared to traditional roofing systems. SPF is very compatible with highly reflective coatings for 'cool roofs' with improved thermal performance.

	Built-up Roof w/Rigid Board	Membrane Roof w/Rigid Board	New Roof Closed-Cell SPF	Trad. Roof Retrofit With Closed-Cell SPF
<b>Thermal resistance (R/inch)</b> Reduces wall thickness/framing cost	✓	✓	✓	✓ ✓
<b>Continuous insulation</b> No thermal shorts from fasteners and gaps			✓	✓
<b>Air Barrier/Air impermeable</b> No drafts. Increases energy savings	✓ *	✓ *	✓	✓
<b>Water vapor retarder</b> Provides moisture and mold control	✓ *	✓ *	✓	✓
<b>Waterproofing</b> Eliminates bulk water ingress	✓ *	✓ *	✓	✓
<b>Structural Enhancement</b> Increased resistance to wind uplift			✓	✓
<b>Durability</b> No leaks and low maintenance costs			✓	✓
<b>Replacement</b> Low cost replacement of roof	Must be torn-off	Must be torn-off	Can spray additional layers	Can spray additional layers

\* With additional membrane



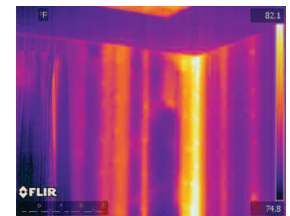
**“Over 90% of the 10 million square feet of roofs on the Texas A&M campus are protected with SPF. Typical payback is 4.5 years.”**

Results of the study performed by Gerald Scott, Director of Energy, Texas A&M University.

## Walls

SPF insulation can be sprayed into the interior cavity of commercial walls, or onto the exterior sheathing. SPF is compatible with many different wall types. SPF insulated buildings have superior thermal performance due to the air barrier properties SPF provides, as well as reduced thermal bridging through the studs. In addition, buildings with SPF will have increased structural strength and reduced mold problems.

	Fiberglass Batts	Extruded Polystyrene (XPS)	Interior Closed-Cell SPF	Exterior Closed-Cell SPF
<b>Thermal resistance (R/inch)</b> Reduces wall thickness/framing cost	3.7	3.8	6.2	6.2
<b>Air Barrier/Air impermeable</b> No drafts. Increases energy savings		✓	✓	✓ Seamless
<b>Water vapor retarder</b> Provides moisture and mold control			✓	✓ Seamless
<b>Continuous insulation</b> Expands to fit and seals cavity No thermal shorts in roofing			✓	✓
<b>Waterproofing</b> Eliminates bulk water ingress		✓	✓	✓
<b>Structural Enhancement</b> Improves structural integrity			✓	✓



**“In steel stud walls, thermal bridges generated by the steel components reduce their thermal performance by up to 55%.”**

Source: Jan Kosny, Jeffrey E. Christian, and André O. Desjarlais, Oak Ridge National Laboratory, Buildings Technology Center

# SPF: The Right Choice for Residential Buildings

SPF seals wall and roof cavities to save the homeowner money on heating and cooling expenses. Not only does it provide thermal protection, it provides moisture and air barriers mitigating dangerous mold and wood rot of the structure.



## Walls

In a residential building envelope, SPF offers three barriers in one:

- Thermal insulation
- Air sealing
- Vapor barrier

Complete air sealing reduces energy consumption, lowering utility bills. The vapor barrier blocks moisture penetration that can lead to mold and wall damage.



## Attics

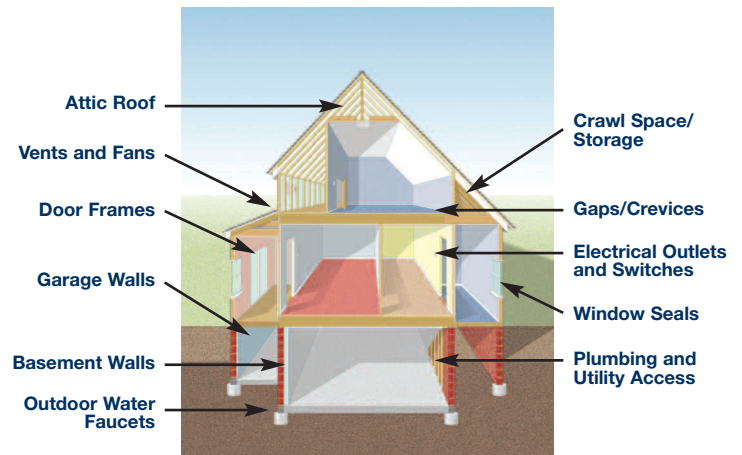
- SPF can be applied to the roof deck to create an 'unvented' attic
- Air leakage between a home's interior and its attic is eliminated, providing healthier indoor air
- Attic temperatures of just a few degrees higher than the home's interior extend the life of HVAC equipment
- Attic humidity controlled to levels below 50% prevents mold

## Home Weatherization

Weatherization is the process of modifying a building envelope to reduce energy consumption. Weatherization can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment.

Spray foam and one-component foams are ideal for weatherization because they provide two key elements in one product: insulation and air-sealing. Weatherization typically involves air-sealing seams, cracks and openings to the exterior of the house with spray foam or one-component foam. If necessary, additional spray foam insulation can be applied to attics, ceilings, exterior walls, basement walls, floors, and crawl spaces.

### SPF for weatherization in the home



## SPF Savings in Use

### 70% Reduction in Heating/Cooling Expenses

- North Texas buildings average 10-14 cents in heating/cooling costs per air-conditioned sq/ft
- Energy-efficient homes with SPF average only 3 cents per air-conditioned square foot

### 50% Reduction in HVAC Tonnage Requirements

- With SPF, HVACs can be downsized from 1 ton per 500 sq/ft of living space to 1 ton per 1,000 sq/ft.

### Tax Credits

- Energy Star Federal Tax Credit for thermal insulation upgrades (09-10) allows for 30% credit up to \$1,500

### 58% Reduction in Utilities

- Roanoke, VA, 2,240 sq/ft ranch home
- Comparison made to 10 similar homes with traditional insulation
- Basis: propane usage from Aug 2000 to July 2001
- Average energy savings of \$475/month

# SPF: The Right Choice for Greener Buildings



SPF use in residential and commercial buildings meets advanced energy codes and helps contribute towards green building certifications. Key sustainable attributes of buildings insulated with spray foam are:

## Lower Embodied Energy

SPF uses less or equivalent energy and raw materials to produce, transport and install compared to traditional insulation products.

## More Energy Efficient Buildings

Buildings insulated with SPF typically use 30-50% less energy to heat and cool compared to buildings insulated with traditional fibrous products.

## Renewable Content

Some SPF formulations contain significant levels of pre- and post-consumer recycled content.

## Durability

SPF is very durable, and produces little waste to landfill.

## Meeting Advanced Energy Codes

In commercial buildings, SPF offers high R-values, allowing for designs with thinner framing material and thereby more efficient use of wood or steel. SPF reduces the thermal bridging effect in commercial buildings with steel studs significantly. With SPF, building designs easily meet the increased roof and wall R-values mandated in the current most stringent ASHRAE 90.1 standard.

Energy Certified Homes based on programs like EnergyStar, EFL and Building America are easily achieved when SPF is used in a residential building envelope.

## Contributing Towards Green Building Certification

SPF can contribute towards green certification programs e.g. LEED and Green Globes for commercial buildings, and LEED-H and the NAHB National Green Building Standard for residential buildings.

Credits are typically obtained in the following sections:

- **Energy and Atmosphere**
- **Sustainable Sites**
- **Material and Resource**
- **Indoor Environmental Quality**
- **Innovation in Design**

In addition, SPF systems with at least 8% renewable content are available – meeting many Federal Procurement Preference Programs.



# The Right Choice

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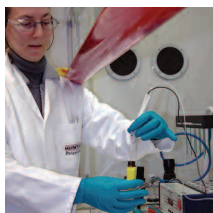
Huntsman is a global leader in the manufacture of spray polyurethane foam (SPF) materials. We offer superior SPF, and expertise in SPF application, building science, building codes, construction practices and more.



## Product

*Partner with the industry leader*

- Global leadership in SPF materials
- Reliability and consistency
- National product and contractor network



## Quality

*Choose the best in class*

- Tested and certified in approved labs
- Superior in-field performance
- Backed by the Huntsman product warranty



## Expertise

*Decades of PU technology experience*

- Access to a global team of highly qualified SPF professionals
- In-depth knowhow in SPF application techniques
- Understanding of construction, building science and codes



## Dedication

*Experience our customized approach*

- Responsive and flexible team
- Creative approach to business

For more information, email us,  
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