



Spray Polyurethane Foam Insulation: Essential Resources and Training

Lee Salamone, ACC Center for the
Polyurethane Industry



Center for the
Polyurethanes Industry

Manufacturers Supporting the Spray Polyurethane Foam Value Chain



Center for the
Polyurethanes Industry



- CPI is the voice of the polyurethanes industry in North America
- Supports manufacturers of polyurethanes and materials to make polyurethanes
- Works collaboratively with downstream users and their customers
- Focus on product stewardship, research and industry promotion, and advocacy

Industry-led Product Stewardship

Primary Goal

To increase understanding of
safe installation practices
regarding
use, handling and disposal of
spray polyurethane foam.



Industry-led Product Stewardship: Three-Pronged Approach



Program focuses on practices and communications that can help to minimize potential for overexposure of workers and building occupants to SPF chemicals.

- **Worker Performance and Training** - develop a health and safety training program for professional SPF applicators.
- **Outreach**- Educate DIY'ers, consumers and the building/construction sector about best practices on key issues including the importance of consulting a professional SPF contractor; different types of SPF products; health and safety considerations for DIY'ers and consumers during and after product installation.
- **Research**- Develop research and support testing programs to improve understanding of potential exposure to chemical components for workers applying SPF and potential consumer/occupant exposure to SPF emissions.

Worker Information and Training

Free Online Health and Safety Training for Spray Polyurethane Foam (SPF)!



- Available at www.spraypolyurethane.org
- Free and easy-to-follow training program
- Learn about safety practices in under 2 hours
- Get your "Recognition of Completion" today!

Visit the Center for the Polyurethanes Industry at www.spraypolyurethane.org for more information



- Posters
- Guidance
- Training
- Website

Free Health and Safety Training Programs for Spray Polyurethane Foam (SPF)



NEW Low Pressure (LP) SPF Chemical Health and Safety Training program.* The training provides information for weatherization professionals, applicators, helpers, contractors or builders who work with one-component SPF (foam in a can) or two-component LP SPF kits/systems for air sealing/insulating. Training is online or instructor-led.



High Pressure (HP) SPF Chemical Health and Safety Training provides information to help understand chemical health and safety considerations as it applies to the use, handling and disposal of two-component, HP SPF systems. Training is online or instructor-led.

This material was prepared under the grant SH-22364-01-1 from the Cooperative Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Visit: spraypolyurethane.org

Working Safely with Low-Pressure Spray Polyurethane Foam Insulation Online DVD



This video provides general guidance for professionals on how to apply low-pressure spray polyurethane foam. It is intended as a supplement to other job safety information already available such as specialized training, Material Safety Data Sheets (MSDS), product label information and other materials.

The video is available to view or download at www.spraypolyurethane.org.



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Spray Polyurethane Foam: Posters

www.spraypolyurethane.com

EXTERIOR SPRAY POLYURETHANE FOAM (SPF) INSULATION PERSONAL PROTECTIVE EQUIPMENT

OSHA REQUIRES PROTECTION FOR SPRAY POLYURETHANE FOAM SPRAYERS, HELPERS AND OTHERS - THOSE USING HIGH PRESSURE DISPENSING EQUIPMENT - AS FOLLOWS:

WELD-100 Use if needed to protect head from falling objects.

EYE PROTECTION Must be worn when spraying or working in areas where spray polyurethane foam is being applied. Eye protection can be incorporated in a mask design or separate safety glasses if a half face respirator is selected for use.

SKIN PROTECTION Intensive garments are used to keep spray and mist from contacting skin and clothing. Personal protection garments are not just for convenience - in wet areas, skin exposure to spray or mist may result in serious health concerns.

White gloves are used to protect the hands. Use heavy work gloves for spraying and lighter dexterity gloves for gun cleaning or repair.

If a breach of gloves or garments is noticed, change out the personal protection garments immediately or report with supervisor.

RESPIRATORY PROTECTION Extensive applications by definition are conducted in open air and typically have an associated respiratory SPF aerosol concentration. For extensive applications with good air flow, sprayers must wear a NIOSH-approved full facepiece Air Purifying Respirator or suit with an organic vapor/cartridge (P100 certified). A NIOSH approved supplied air respirator or suit, if chosen, may provide greater protection for operators. Overlays should be installed to avoid problems with subjects, animals or equipment persons disoriented by the spray. All spray areas should post warning signs of spraying.

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INTERIOR SPRAY POLYURETHANE FOAM (SPF) INSULATION PERSONAL PROTECTIVE EQUIPMENT

OSHA REQUIRES PROTECTION FOR SPRAY POLYURETHANE FOAM APPLICATORS - THOSE USING HIGH PRESSURE DISPENSING EQUIPMENT - AS FOLLOWS:

WELD-100 Use if needed to protect head from falling objects.

EYE PROTECTION Must be worn when spraying or working in areas where spray polyurethane foam is being applied. Eye protection can be incorporated in a full face mask design.

SKIN PROTECTION Personal protection garments are used to keep spray and mist from contacting skin and clothing. Personal protection garments are not just for convenience - in wet conditions, skin exposure to spray or mist may result in serious health concerns. White gloves are used to protect the hands. Fabric gloves fully coated in white, neoprene, butyl, PVC or other gloves can be used over nitrile gloves for spraying. Suits may be used to seal and seal openings as needed.

If a breach of gloves or garments is noticed, change out the personal protective garments immediately or report with supervisor.

RESPIRATORY PROTECTION Intensive applications by definition are conducted indoors and may have significant material air movement or are conducted in smaller cubic air volume spaces. For interior applications, sprayers must wear a NIOSH-approved supplied air respirator or full facepiece Air Purifying Respirator or suit with organic vapor/cartridge (P100 certified) may be used by sprayers if adequate ventilation is provided to or outside the immediate spraying area.

MAINTENANCE Employees should use fan and maintain respiratory air by the manufacturer and store in a clean, dry, sanitary location such as in a sealed bag or container - especially for organic vapor cartridges, and away from direct sunlight.

Inform job superintendents if:

- respirators no longer fit or are damaged;
- hardware are not adequately connected to the workplace; and
- cartridges need replacing the Respiratory Protection Program.

WORK BOOTS Steel-toed work shoes are desirable in most work areas. Protection from equipment can be provided by rubber insoles or disposable covers. If it does not compromise the grip of the work shoes.

Always read and understand the spray polyurethane foam manufacturer's Material Safety Data Sheet or MSDS before starting any spray foam application.

ACTIVITY	WELD-100	EYE PROTECTION	SKIN PROTECTION	RESPIRATORY PROTECTION	MAINTENANCE
Exterior applications with high air velocity	✓	✓	✓	✓	✓
Interior applications with high air velocity	✓	✓	✓	✓	✓
Interior applications with low air velocity	✓	✓	✓	✓	✓
Interior applications with low air velocity (e.g., spray foam)	✓	✓	✓	✓	✓

For more information, visit:
www.spraypolyurethane.com
The American Chemistry Council's Center for the Polyurethane Industry
www.americanchemistry.com/polyurethane or www.spraypolyurethane.com
SPFA
American Chemistry Council



HAVE YOU READ THE MSDS?
BEFORE USING ANY SPRAY POLYURETHANE INSULATION PRODUCT, YOU MUST...

READ AND UNDERSTAND THE ENTIRE MATERIAL SAFETY DATA SHEET (MSDS)

Sections 1, 2, 3 CHEMICAL IDENTIFICATION HAZARD WARNINGS COMPOSITION	Do you know the hazards of every chemical you are handling? • Component & (Inorganic) • Component B (Flammable, Polyol, Amine Catalyst, Blowing Agent, Fire Retardant) • Solvents • Cleaning Solutions • Coatings?
Section 8 PERSONAL PROTECTION	Are you using the correct Personal Protection Equipment for the job? • Supplied Air Respirator, • Eye Protection, • Gloves • Coveralls, • Boots?
Sections 6 & 7 ACCIDENTAL RELEASES STORAGE AND HANDLING	Are you storing and handling the chemicals as directed? • Do you know how to properly contain and clean a spill ?
Section 4 FIRST-AID	What should you do if there is an accidental exposure ? • Do you know first-aid procedures? • Do you have first aid materials at the work site?
Sections 6 & 9-16 OTHER INFORMATION "READ THE ENTIRE MSDS"	Did you know that other information is provided on an MSDS? • Fire-Fighting Measures; • Physical-Chemical Properties; • Stability and Reactivity; • Toxicology; • Disposal; • Transportation; and • Regulatory information?

For more information, visit:
www.spraypolyurethane.com
The American Chemistry Council's Center for the Polyurethane Industry
www.americanchemistry.com/polyurethane or www.spraypolyurethane.com
SPFA
American Chemistry Council

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Exterior Spray Polyurethane Foam Insulation Health & Safety Q&A

For Spray Foam Contractors



This Exterior Spray Polyurethane Foam Insulation Health & Safety Q&A document (describing spray applications done on the outside of a building) and the

What are the potential health hazards of SPF chemicals?

A-side
Inhalation overexposure can result in 1) irritation of the nose, throat, and lungs, causing runny nose, sore throat, coughing, tightness in the chest, and shortness of breath, and 2) respiratory tract sensitization (i.e., the development of asthma) with symptoms of chest tightness, shortness of breath, coughing, and/or wheezing. Note that severe asthma attacks can be

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Interior Spray Polyurethane Foam Insulation Health & Safety Q&A

For Spray Foam Contractors



This Interior Spray Polyurethane Foam Insulation Health & Safety Q&A document (describing spray applications done on the inside of a building) and the

companion Exterior Spray Polyurethane Foam Insulation Health & Safety Q&A document (describing spray applications done on the outside of a building) were created to provide general guidelines for safe spray polyurethane foam application.

These general guidelines are intended to supplement the specific and detailed information from the materials suppliers (Material Safety Data Sheet and Product Data Sheet) that you are using for your installation. Many different variables are present in the various applications, so each case must be evaluated individually so that proper protection is afforded. It is applicable to those on or around the worksite where spray foam is being installed.

What are the chemicals used in spray polyurethane foam (SPF)?

A-Side or "Isoc": Also known as polymeric methylene diisocyanate or "PMDI" and typically contains 50% MDI and 50% higher molecular weight oligomers of MDI.

B-Side or "Isoc": Also known as the polyol blend, and is comprised mostly of polyols, with smaller amounts of catalysts, blowing agents (closed cell foam only), flame retardants, and surfactants.

What are the potential health hazards of SPF chemicals?

A-side
Inhalation overexposure can result in 1) irritation of the nose, throat, and lungs, causing runny nose, sore throat, coughing, tightness in the chest, and shortness of breath, and 2) respiratory tract sensitization (i.e., the development of asthma) with symptoms of chest tightness, shortness of breath, coughing, and/or wheezing. Note that severe asthma attacks can be life threatening. NIOSH notes that "early recognition of sensitization and prompt and strict elimination of exposures is essential to reduce the risk of long-term or permanent respiratory problems for workers who have become sensitized."

Skin contact can cause 1) irritation, and 2) sensitization (allergic). Symptoms include reddening, itching, swelling, and rash. Skin contact alone may lead to respiratory sensitization. Eye contact can cause reddening, watering, stinging, and/or swelling of the eyes.

B-Side
Inhalation overexposure may result in irritation of the respiratory tract, causing cough, sore throat, and runny nose. Irritation of the eyes (liquid or vapor) and skin (liquid) also are possible. In addition, skin contact with some amine catalysts may lead to skin sensitization. Cardiac arrhythmia (irregular heartbeat) is a symptom of overexposure to certain blowing agents. In addition, the vapors of some amine catalysts can temporarily cause vision to become foggy or blurry, and halos may appear around bright objects such as lights.

Refer to your supplier's Material Safety Data Sheets (MSDS) for a complete listing of the composition and potential health effects of A and B-side chemicals.

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Hazard Communication for Spray Polyurethane Foam Insulation Applications

OSHA Standard 29 CFR 1910.1200
OSHA Standard 29 CFR 1926

Overview

The Standard was designed to provide employees with information on:

• T
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• H

• Do you have a medical surveillance program for employees if hazardous chemicals are being used (such as respiratory and skin sensitizers)?

Our Standard

The OSHA Standard requires employers to develop a

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"Green" Marketing Claims and Spray Polyurethane Foam

Spray polyurethane foam (SPF) is an exciting insulation product that is exploding in popularity for many reasons. Among its many outstanding attributes are several that could be understood by consumers to be "green" attributes - for example, some SPF is made in part with natural oils, giving the foam some renewable content. And because SPF is an expanding insulator, it can contribute significantly to home and building energy efficiency and energy savings.

When these "green" attributes are described as part of product marketing - whether advertisements, promotional materials, sales claims, or labels - they are considered "green" claims. Green claims are the marketing response to consumers' increasing interest in protecting the environment. They can help consumers better understand the environmental attributes of a product or service and help inform purchasing decisions.

Who is a "marketer"?

Marketers include anyone who is making a promotional claim to sell a product or service.

Who is responsible for marketing claims about a SPF product or service?

The product manufacturer is responsible for claims about the product. For SPF, a finished package of all the components needed to mix and make the foam is typically marketed as a kit or "system." The manufacturer of the SPF system is responsible for marketing claims about the system. If the SPF product is a product that is sold directly to consumers, such as a one component foam sold in a can, the manufacturer of that product is responsible for marketing claims about that product.

The provider of a service, such as a spray foam applicator, is responsible for claims about the service.

such as claims that the application will be made in a timely way, or that the premises will be cleaned up after the application is completed.

Are there restrictions on the kinds of environmental marketing claims that can be made?

Yes. Federal law prohibits deceptive acts or practices, including deceptive representations in advertising, labeling, product inserts, catalogs, and sales presentations. Some deception cases have involved representations or practices likely to mislead consumers; others have involved omissions of information.

What is a deceptive claim?

It is usually easy to see how an express misrepresentation of fact can be considered a deceptive claim. But it is also important to understand that omissions of information, and implied claims, can both be considered deceptive claims in certain circumstances. The Federal Trade Commission's (FTC) Policy Statement on Deception says that deception occurs when (1) there is a representation, omission, or practice that is likely to mislead the consumer; (2) the consumer is acting reasonably under the circumstances; and (3) the representation, omission, or practice is material. While express claims tend to speak for themselves the representation itself establishes the meaning, for implied claims, FTC will consider "the representation itself, including an evaluation of such factors as the entire document, the juxtaposition of various phrases in the document, the nature of the claim, and the nature of the transactions." FTC may also consider an omission deceptive if the representation creates "a reasonable expectation or belief among consumers which is misleading, absent the omitted disclosure."

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Exterior Applications Using Spray Polyurethane Foam Containing MDI/PMDI: Seven Important Points for Spray Polyurethane Foam Contractors

Here are seven important points you will want to know when applying spray polyurethane foam (SPF) containing methylene diisocyanate (MDI) and/or polymeric MDI (PMDI) to exterior applications.

1. What is MDI?

The acronym MDI was derived from one of the chemicals' many names, methylene diisocyanate. Polymeric MDI is a mixture of monomeric MDI and polymeric MDI and is a brownish liquid at room temperature. MDI/PMDI is one component used in the application of spray polyurethane foam typically

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Indoor Commercial and Residential Insulation Using Spray Polyurethane Foam Containing MDI/PMDI: Seven Important Points for Spray Polyurethane Foam Contractors

Here are seven important points you will want to know when applying spray polyurethane foam (SPF) products for indoor commercial and residential insulation containing methylene diisocyanate (MDI) and/or polymeric MDI (PMDI).

This document provides general guidance to spray polyurethane foam contractors about important health and safety aspects of working with MDI during the spraying of polyurethane foam. Although MDI is a commonly used material in spray polyurethane foam (SPF) for commercial and home insulation systems, it is not the only material in the system that can present health hazards. SPF systems also contain B-side, which is a mixture of other chemicals, including polyols, amine catalysts, flame retardants, and surfactants, among other ingredients that may pose potential health hazards. Therefore, it is important to read all information contained in your supplier's Material Safety Data Sheet (MSDS) for the particular SPF product you are using. MSDSs are the primary source of extensive and specific information on MDI, PMDI and other SPF system ingredients.

This guidance document is intended to help SPF companies educate their workers and provide appropriate worker protection related to MDI/PMDI. This document does not include a discussion of the "B-side" chemicals present in the SPF system. Consult the MSDS for more information. Always follow the product-specific information in the MSDS.



1. What is MDI?
The acronym MDI was derived from one of the chemicals' many names, methylene diisocyanate. Polymeric MDI is a mixture of monomeric MDI and polymeric MDI and is a brownish liquid at room temperature. MDI/PMDI is one component used in the application of SPF products, typically referred to as the "A-side" or the "iso-side" of the system and requires special handling and care.

2. Recognizing Potential Health Hazards

Contact with excessive amounts of MDI can be harmful to your health. When MDI is sprayed, you may be overexposed by:

- Breathing high airborne concentrations of MDI
- Getting MDI on your skin
- Getting MDI in your eyes
- Swallowing MDI

In addition to what is identified in the products' MSDS, here are some examples of the effects of overexposure and some commonly used first-aid procedures:

Inhalation: If MDI is sprayed or heated, there is a chance of overexposure. Overexposure means airborne concentrations greater than either: (1) the U.S. Occupational Safety & Health Administration (OSHA) Permissible Exposure Limit-Ceiling of 20 parts per billion (ppb) at any time during the workday; or (2) the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 5 ppb as an 8-hour time weighted average (TWA). MDI can irritate your nose and lungs. With overexposure, you may feel tightness in your chest and have difficulty

Spray Polyurethane Foam: Guidance

www.spraypolyurethane.com

Handling and Disposing Drums Containing Spray Polyurethane Foam (SPF)

February 9, 2011

Presented by:
William Robert, CIH
BASF

Guidance for Selecting a Contractor for the Installation of Spray Polyurethane Foam (SPF) in School Buildings

ISSUE A/6/02 • MAY 2012

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Purpose

This guidance is intended to provide useful information to school administrators, design planners, facilities managers and others about how to select and work with professional spray foam contractors to help achieve a successful SPF installation. This document provides tips and guidance to help everyone involved in the process and to inform decision makers about the benefits, potential hazards, and ways to achieve a successful SPF installation. This information may also be helpful for design professionals and energy service companies involved in roofing

Fire Safety Guidance

Working with Polyurethane Foam Products During New Construction Retrofit and Repair



Safety First

DISPOSAL OF USED SPRAY POLYURETHANE FOAM DRUMS

By Neeva-Gayle Candelori, Director, Center for the Polyurethanes Industry

For spray polyurethane foam (SPF) contractors, the job isn't done until the drum is properly disposed. Sure, contractors know that disposal of drums must always proceed in accordance with the foam manufacturer's instructions, but do they know that since empty drums are potentially hazardous, it's crucial that they be handled properly by appropriately trained personnel?

UNDERSTANDING SPF COMPONENTS

The SPF components are made up of an "A" side – polymeric methylene diphenyl isocyanate, pMDI, or MDI-based diisocyanate – and a "B" side – polyol resin, polyol-based system with smaller amounts of catalyst(s), a blowing agent, flame



CPI SPF Health and Safety Training Programs: High-Pressure

High-pressure health and safety training launched in Dec. 2010.

The program provides free online health and safety information for SPF contractors, applicators or helpers who work with two-component high-pressure SPF systems.

More than 9,800 users have accessed the training program either online or in an instructor-led capacity.

This program was recently upgraded and translated into Spanish (Dec 2012).



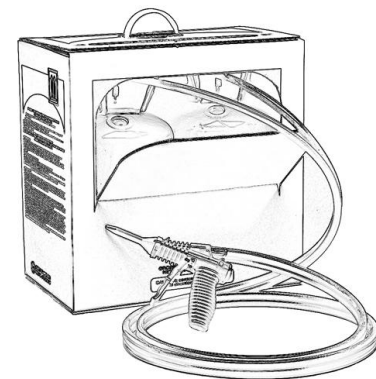
CPI SPF Health and Safety Training Programs: Low-Pressure

Low-pressure health and safety training launched in Dec. 2012 in English and Spanish.

This training was supported by grant funding from OSHA.

The Low-Pressure Training provides information for weatherization professionals, applicators or helpers who work with one-component SPF or two-component, low-pressure SPF kits for sealing and insulating.

More than 1,200 users have accessed the training program either online or in an instructor-led capacity.



Key Outreach Tool

www.spraypolyurethane.org

Spray Polyurethane Foam

HEALTH and SAFETY


Search... Go

Home | Professional Contractors | Weatherization Contractors | Do-It-Yourselfer | Homeowners | News Room

Whether you're a [homeowner](#) hiring someone to install spray polyurethane foam (SPF) for you, a [do-it-yourselfer](#), an SPF [contractor](#), [builder](#) or [weatherization professional](#), this site will give you the facts about SPF and important safety guidelines that should be followed during application.

I'm an SPF contractor/building and construction


PROFESSIONAL



Learn more ►

I'm a **WEATHERIZATION**


contractor/professional



Learn more ►

I'm a **DO-IT-YOURSELFER**


installing SPF




Learn more ►

I'm a **HOMEOWNER**


having SPF professionally installed



Learn more ►

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New! Health and Safety Training



Low Pressure SPF Chemical Health and Safety Training


» [CLICK HERE TO REGISTER!](#)

» [Guide to Become an In-Person Instructor](#)

» [Check Applicator Status](#)

» [¡Ahora en Espanol!](#)

Health and Safety Training



High Pressure SPF Chemical Health and Safety Training

» [CLICK HERE TO REGISTER!](#)

» [Guide to Become an](#)

Research and Testing Initiatives



Development of research and testing projects for SPF raw materials, engineering practices, and analytical methods

- Evaluate Airborne SPF Chemical Concentrations While Varying Air Flow Rates During Application
 - SPF Ventilation Study
- Develop a Standard Method to Evaluate SPF Chemical Emissions After SPF Application
 - Indoor Air Quality Study

Spray Foam Coalition



Formed at CPI in 2010 as a forum for manufacturers of spray foam systems and their suppliers to:

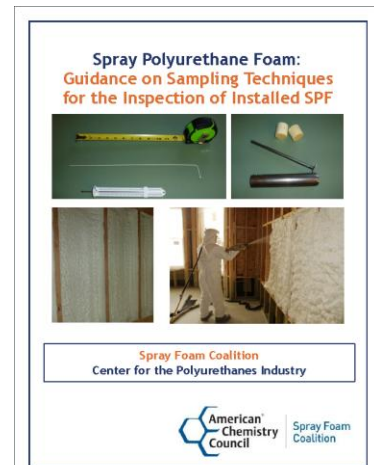
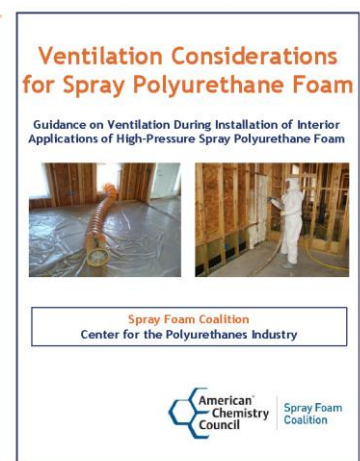
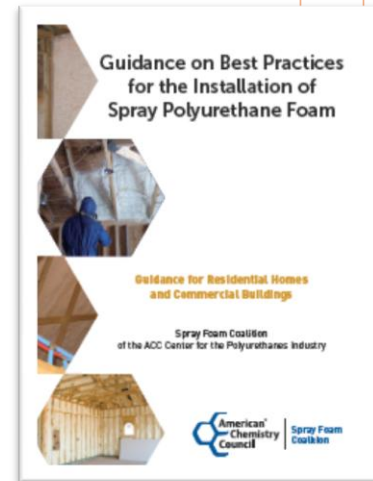
- Champion the use of spray polyurethane foam
- Support the safe manufacture, transport, and application of spray polyurethane foam
- Promote the economic, environmental and societal benefits of SPF
- Provide a forum to help shape public policy on issues critical to the industry



Spray Foam
Coalition

Spray Foam Coalition

- Guidance documents
- Support for CPI Product Stewardship efforts
- Support for development of SPFA Contractor Certification
- Research to better understand SPF characteristics
- Promote improvements to Building Codes, ASTM Standards, and Acceptance Criteria for SPF (AC377)



Spray Foam Coalition

- Outreach to Users, Builders, and Homeowners
 - SPF use information
- Promotion of SPF and its benefits

Why Choose Spray Foam?

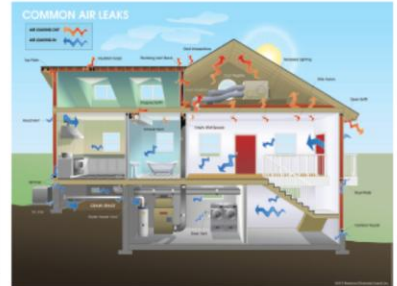
What is Spray Foam?

Spray polyurethane foam (SPF) is a spray-applied plastic that can form a continuous insulation and air sealing barrier on walls, roofs, around corners and other surfaces. SPF insulation is known to resist heat transfer extremely well and offers a highly effective solution in reducing unwanted air infiltration.

Spray Foam is an Energy Efficiency Solution

As much as 40% of a building's energy is lost due to air infiltration. Gaps, holes and air leaks can make energy bills unnecessarily high. Spray foam performs as both insulation and an air barrier, closing gaps that let air escape and add dollars to monthly energy bills.

As much as half of the energy used in a home goes to heating and cooling, according to EPA¹. Maintaining an optimal



A banner for the Spray Foam Coalition website. It features a man and a woman sitting on a concrete step in front of a house. The text "SPRAYFOAM" is prominently displayed in large, bold letters, with "Spray Foam Makes Sense" underneath. Below the banner, there are three columns of text: "HOMEOWNERS Learn more about", "BUILDERS Learn how you can", and "ARCHITECTS Learn more about the". There is also a search bar with the text "Search..." and a "Search" button.

Spray Polyurethane Foam Can Save Energy in Buildings



- SPF is a product that is manufactured on site, which creates unique advantages and safety considerations
- Use a trained professional contractor
- Use the right product for the right job - understand building science
- Look to the spray polyurethane foam industry for support in understanding, choosing, installing and promoting the use of spray polyurethane foam in buildings
- Visit www.spraypolyurethane.org and www.whysprayfoam.org for more info



Thank You!

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