

# Spray Polyurethane Foam Product Stewardship Guidance





Center for the Polyurethanes Industry



## Announcing Spray Polyurethane Foam Enhanced Product Stewardship Program

The polyurethanes industry, working together through the American Chemistry Council's (ACC) Center for the Polyurethanes Industry (CPI) and the Spray Polyurethane Foam Alliance (SPFA), has launched an enhanced product stewardship program to support further understanding of the benefits of spray polyurethane foam (SPF), safe use and handling, hazard communications, and marketing claims. We believe that the timing for this program could not be better with the rapidly growing popularity of SPF as a solution to more energy efficient homes and buildings. Spray foam applicators and other on-site workers need to understand that proper protective equipment and other precautions are essential to safe installation of these materials – as do those involved in the building and construction community – to protect from potential overexposure to spray foam ingredients during the application of the SPF system. EPA, OSHA, NIOSH and other federal agencies also have expressed significant interest in many of these same issues and we expect that public interest will grow as the popularity of spray foam expands. In the coming months, the polyurethane industry will be working together with the federal agencies on many of these issues.

### New SPF Health and Safety Website

As part of this multi-year program, a new Spray Polyurethane Foam Health and Safety website, **[www.spraypolyurethane.com](http://www.spraypolyurethane.com)**, has been launched with new materials, including literature and posters, that we encourage you to share with your colleagues and customers to increase understanding of SPF product stewardship information. The materials are free and easy to print and download.

On the new website, you will find information covering a wide range of topics including an overview of SPF health and safety guidelines, personal protective equipment, typical first-aid treatment, and information about “green” marketing. This site will continue to evolve in the coming months so please visit often. You also are encouraged to visit the CPI website at **[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane)** and the SPFA website at **[www.sprayfoam.org](http://www.sprayfoam.org)** where you will find valuable information about the many uses and benefits of SPF, as well as additional use, handling, and disposal information.

### National Outreach Program to Entire SPF Community

We need your help in spreading awareness of this important industry initiative throughout the SPF community. As we bring together industry experts to address important worker health and safety considerations such as the use of personal protective equipment, respirators, hazard communications, and other important topics such as ventilation techniques, and re-entry scenarios, we urge you to join us as we work collectively to enhance national health and safety practices across the United States.

To learn more about the benefits of SPF and its continued safe use and handling, visit **[www.spraypolyurethane.com](http://www.spraypolyurethane.com)**.

Sincerely,

**Neeva-Gayle Candelori**  
Director  
ACC Center for the Polyurethanes Industry

**Kurt Riesenberg**  
Executive Director  
Spray Polyurethane Foam Alliance

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## SECTION 1

# Hazard Communications

- Hazard Communication for Spray Polyurethane Foam Insulation Applications
- Have You Read The MSDS?

## 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:

- The hazards and identities of all chemicals used in the workplace.
- Protective measures against adverse effects from use and handling including potential exposure.

### Employers

- ✓ Do you have a written Hazard Communication Program?
- ✓ Do you have a list of all chemicals in the workplace and their potential hazards?
- ✓ Are all Material Safety Data Sheets (MSDSs) readily accessible to every employee?
  - ✓ Do you have MSDSs in a language that all employees can read and understand?
- ✓ Have your employees been trained on:
  - ✓ Reading labels?
  - ✓ Reading and understanding an MSDS?
  - ✓ How to obtain and use hazard information?
  - ✓ Appropriate work procedures?
  - ✓ Emergency procedures?
  - ✓ Proper personal protective equipment for each job?
- ✓ 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 written HAZARD COMMUNICATION program, which must include:

- A list of all hazardous materials used in the work place. This list needs to be reviewed annually and updated as new materials enter the workplace.
- The procedures used to collect and maintain an MSDS for each chemical used in the workplace. The MSDSs must be readily available to the employees at each worksite.
- A description of the labeling system used for chemical containers.
- The procedures used to ensure that all containers are properly labeled.
- The methods of training and providing hazardous material information to employees.
- Procedures for safely conducting non-standard work practices.
- Procedures for ensuring contractors and other non-employees are informed of the hazardous materials in the workplace.



# Guidance Document

## Training

Here are some key points to cover in training:

- Requirements of the OSHA standard.
- Information on any operation in the area where hazardous materials are present.
- Procedures for identifying hazardous materials.
- Safe handling procedures, including:
  - personal protective equipment to be used;
  - appropriate work practices;
  - non-routine tasks; and
  - emergency procedures.
- Storage procedures.
- Use of labels and MSDSs.
- Employee access to MSDS files.
- How to interpret MSDS information.
- Your written hazard communication policy.
- Communication with contractors.

**If respirators are required, as with spray polyurethane foam applications, a detailed written Respirator Program is required.**

This program should include:

- Appropriate respirator identified for each job performed at the work site such as:
  - Supplied-air respirator (full face, hood, or helmet)
  - Air-purifying respirator, etc.
- Medical exam
- Respirator fit test

## Sources of Additional Information

### OSHA website:

[www.osha.gov/SLTC/hazardcommunications/index.html](http://www.osha.gov/SLTC/hazardcommunications/index.html)

### NIOSH website:

[www.cdc.gov/niosh/homepage.html](http://www.cdc.gov/niosh/homepage.html)

### NIOSH Pocket Guide:

[www.cdc.gov/niosh/npg/](http://www.cdc.gov/niosh/npg/)

### International Chemical Safety Cards:

[www.cdc.gov/niosh/ipcs/nicstart.html](http://www.cdc.gov/niosh/ipcs/nicstart.html)

### National Fire Protection Association:

[www.nfpa.org](http://www.nfpa.org)

### For more information, visit:

#### The American Chemistry Council's Center for the Polyurethanes Industry

[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) or  
[www.spraypolyurethane.com](http://www.spraypolyurethane.com)

#### Spray Polyurethane Foam Alliance

[www.sprayfoam.org](http://www.sprayfoam.org)

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This document was prepared by the American Chemistry Council (ACC) Center for the Polyurethanes Industry (CPI) and the Spray Polyurethane Foam Alliance (SPFA). It is intended to provide general information to persons who may handle or apply spray polyurethane foam chemicals. It is not intended to serve as a substitute for in-depth training or specific handling or application requirements, nor is it designed or intended to define or create legal rights or obligations. It is not intended to be a "how-to" manual, nor is it a prescriptive guide. All persons involved in handling and applying spray polyurethane foam chemicals have an independent obligation to ascertain that their actions are in compliance with current federal, state and local laws and regulations and should consult with their employer concerning such matters. Any mention of specific products in this document is for illustration purposes only and is not intended as a recommendation or endorsement of such products.

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# 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 A (Isocyanate);
- Component B (Resin, 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 5, 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:

The American Chemistry Council's Center for the Polyurethanes Industry  
[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) or [www.spraypolyurethane.com](http://www.spraypolyurethane.com)

Spray Polyurethane Foam Alliance  
[www.sprayfoam.org](http://www.sprayfoam.org)

\* According to ANSI Z400-2004 16 section MSDS.  
OSHA does not mandate specific sections, your MSDS may be different, but all information should be available.

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Center for the Polyurethanes Industry



## SECTION 2

# Effective Workplace Practices

- Good Safety Practices – Application
- Good Safety Practices – Drum Handling
- Good Safety Practices – Equipment Storage
- Good Safety Practices – Gun Maintenance
- Good Safety Practices – Personal Protective Equipment
- Good Safety Practices – Spill Containment

# GOOD SAFETY PRACTICES APPLICATION



## FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit\*
- Nitrile rubber glove\*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover\*

\* These items are made to be disposed of after use. Follow MSDS instructions for the disposition of any liquid materials that may be present before disposal.



## NITRILE/PVC GLOVES WORN DURING GUN REPAIR

- Protects from potential chemical contact to exposed skin area
- Use chemical splash protection for the eyes if cleaning solvents are being used in the maintenance procedure



## HOSE INSPECTION FOR INTEGRITY

- Inspect for leaks, abrasion and exposed chemical hoses



## CHEMICAL CHANGEOVER

- Reduces spill potential
- Reduces thread damage
- Liquid splash PPE, nitrile gloves and eye splash protection



## FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit\*
- Nitrile rubber glove\*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover\*

\* These items are made to be disposed of after use. Follow MSDS instructions for any liquid materials that may be present before disposal.



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# GOOD SAFETY PRACTICES

## DRUM HANDLING



### DRUM BRACING

- Reduces spill potential
- Transit requirement D.O.T.
- Drums tightly sealed
- Drums labeled with necessary information
- Read and Understand MSDS for product before handling
- Part A, Isocyanate is moisture sensitive
- Part B, Resin, open slowly to allow pressure to escape



### DRUM DISPOSAL

- Do not reuse drums
- Reclaiming Drums reduces waste
- Crushing reduces waste volume
- Reference: Guidelines for the Responsible Disposal of Wastes and Containers from Polyurethane Processing (#AX-151)
- Cut with pneumatic chisel only – never use flame



### DRUM CHANGE OUT

#### DO

Pulling pump out straight helps avoid excess drainage on drum

- Reduces spill potential
- Reduces thread damage
- Liquid splash PPE, nitrile gloves and eye splash protection



### DRUM CHANGE OUT

#### DON'T

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# GOOD SAFETY PRACTICES EQUIPMENT STORAGE



## DRUM BRACING

- Reduces spill potential
- Transit requirement D.O.T.
- Drums tightly sealed
- Drums labeled with necessary information
- Read and understand MSDS for product before handling



## HOSES/CORDS NEATLY ORGANIZED

- Reduces tripping/falling hazard
- Reduces excessive wear on equipment



## FIRE EXTINGUISHER ON TRUCK

- Fully charged and Inspected
- Accessible and Trained Operators
- Water, dry extinguishing media, carbon dioxide, foam are acceptable for use.



## FIRST AID KIT

- Portable kit desirable for minor injuries
- Include emergency phone numbers near cabinet
- Periodically check kit for completeness
- Clean water available for eye wash; Construction areas may need several gallons clean water carried in for this use

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# GOOD SAFETY PRACTICES

## GUN MAINTENANCE



### FIRST AID KIT

- Portable kit desirable for minor injuries
- Include emergency phone numbers near cabinet
- Periodically check kit for completeness



### EYE PROTECTION

- Side shields protect against side splash
- Designed for possible chemical splash



### FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit \*
- Nitrile rubber glove \*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover \*

\* These items are made to be disposed of at the end of their protection. Follow MSDS instructions for disposition of any liquid materials that may be present before disposal



### NITRILE/PVC GLOVES WORN DURING GUN REPAIR

- Protects from potential chemical contact to exposed skin area
- Use chemical splash protection for the eyes if cleaning solvents are used in the maintenance procedure

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# GOOD SAFETY PRACTICES

## PERSONAL PROTECTIVE EQUIPMENT



### FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit \*
- Nitrile rubber glove \*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover \*

\* These items are made to be disposed of at the end of their protection. Follow MSDS instructions for disposition of any liquid materials that may be present before disposal



### CHEMICAL CHANGEOVER

- Reduces spill potential
- Reduces thread damage
- Liquid splash PPE, nitrile gloves and eye splash protection



### NITRILE/PVC GLOVES/COTTON GLOVES WORN DURING SPRAYING

- Nitrile gloves protect the skin from possible chemical exposure
- Cotton glove or work gloves protect hands from warmth and fatigue



### NITRILE/PVC GLOVES WORN DURING GUN REPAIR

- Protects from potential chemical contact to exposed skin area
- Wear chemical splash protection for the eyes if cleaning solvents are being used in the maintenance procedure.



### FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit \*
- Nitrile rubber glove \*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover \*

\* These items are made to be disposed of after use. Follow MSDS instructions for any liquid materials that may be present before disposal.



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# GOOD SAFETY PRACTICES

## SPILL CONTAINMENT



### PIGS FOR SPILL CONTAINMENT

- Available on truck with compounds
- Appropriate quantity on hand for possible spills
- Follow MSDS to dispose of properly



### SPILL ABSORBENT CAN BE

- Sand
- Sweeping compound
- Kitty litter or other absorbing material
- Decontaminate and dispose per MSDS



### MSDS ON TRUCK

- Current editions
- Clear/dry storage area
- Readily available



### FULL PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chemical resistant suit \*
- Nitrile rubber glove \*
- Approved respiratory protection (clean and maintain)
- Eye protection with side shields (clean and maintain)
- Headcover \*

\* These items are made to be disposed of after use. Follow MSDS instructions for disposition of any liquid materials that may be present before disposal.



### DECONTAMINATION SOLUTION

- Portable unit
- Solution made up for compound per MSDS for part A and part B and kept on hand

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## SECTION 3

# Interior Spray Polyurethane Foam Applications

- Interior Spray Polyurethane Foam Insulation Health and Safety Q&A
- Interior Spray Polyurethane Foam Insulation – Personal Protective Equipment
- Indoor Commercial and Residential Insulation Using SPF Containing MDI/PMDI: Seven Important Points for SPF Contractors

## 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 “Iso”:** Also known as polymeric methylene diphenyl diisocyanate or “PMDI” and typically contains 50% MDI and 50% higher molecular weight oligomers of MDI.

**B-Side or “Resin”:** 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 (allergy). Symptoms include reddening, itching, swelling, and rash. Skin contact alone may lead to respiratory sensitization. Eye contact can cause reddening, tearing, 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.

# Guidance Document

Due to the potential health hazards just mentioned, it is important to avoid inhalation of, and skin and eye contact with SPF chemicals.

## What type of personal protective equipment (PPE) should sprayers wear during spraying?



- NIOSH-approved full-face or hood-type supplied air respirator (SAR) operated in positive pressure or continuous flow mode.



Note: Respirators should be used in accordance with your company's written Respiratory Protection Program (RPP), which is required by the U.S. Occupational Safety & Health Administration (OSHA). Among other items, the RPP should include provisions for medical evaluations, fit testing, training, and cartridge change-out schedules.

- Disposable coverall with attached hood. It is important that all exposed skin be covered. Where heat stress may be a concern, consider the use of lightweight disposable coveralls.



- Disposable over-boots with skid-resistant soles. In circumstances where overboots may create a slip/fall hazard, its use may be omitted.



- Fabric gloves fully coated

with nitrile, neoprene, butyl, or PVC. Alternatively, cotton gloves over nitrile gloves may be used.

## What type of PPE should helpers wear while spraying is being conducted?

Helpers working in the application area should wear a full-face or hood-type SAR, disposable coveralls with attached hood, and nitrile, neoprene, butyl, or PVC gloves. Other glove options include 1) fabric gloves fully coated in nitrile, neoprene, butyl, or PVC; and 2) cotton gloves over nitrile gloves. In some cases, such as when the work area is well ventilated or when helpers are not working in the immediate vicinity of the applicator, helpers may be able to wear full face air purifying respirators (APR) with organic vapor/particulate (P100) cartridges instead of SARs. Professional judgment must be exercised in making this determination, taking into consideration the specific circumstances of the job site/application.

Appropriate PPE, such as respiratory protection, disposable coverall with attached hood, and gloves (see glove options mentioned in the preceding paragraph), should be worn during trimming of foam and during clean-up activities in the application area following spraying.

## Should the work area be ventilated during application?

Depending on the weather and conditions of the job site (e.g. proximity to other buildings, vehicles, bystanders/passersby), ventilation of the application area may be necessary. For example, if a room has windows and/or doors on opposite sides, these can be opened to allow air to flow through the spray area. Other techniques for containing and ventilating the spray area may also be used. Further detail on these techniques is being developed and will be available in the near future. Also, it is important to note that confined areas such as attics and crawlspaces should be ventilated.

# Guidance Document

## What type of PPE should be worn during handling of liquid SPF chemicals?

The type of PPE used will depend on the particular activity and the associated potential for exposure. The following suggestions are offered as general guidance.



- Chemical safety goggles



- Nitrile, neoprene, butyl, or PVC gloves
- If splash to the body is possible, impermeable protective clothing (e.g., PVC, polyethylene)



- If handling heated SPF chemicals, NIOSH-approved APR with combination organic vapor/particulate (P100) cartridges

## What type of PPE should be worn during handling of solvents?

Consult the manufacturer's MSDS.

## What are the suggested first-aid measures?

First-aid measures can be found on the MSDS. Here are some typical first-aid suggestions:

### Inhalation

- Move the individual to fresh air.
- Administer CPR and/or oxygen if needed.
- Seek immediate medical attention.

### Eyes

- Flush with lukewarm water for at least 15 minutes.
- Seek medical attention.

### Skin

- Remove contaminated clothing.
- Wash thoroughly with soap and water.
- Seek medical attention if irritation develops or persists.

## Ingestion

- Do not induce vomiting.
- If conscious, rinse mouth with water.
- Seek medical attention.

## What are some good work practices to follow?

- Have the most current MSDS for each chemical brought onto the jobsite readily available (e.g., keep in the spray rig)
- Prior to the start of each job, it is advisable to have a discussion with the building owner and/or occupant(s) to talk about items such as potential odors associated with the newly-installed foam and any other questions the owner/occupant may have, such as reoccupancy times.
- Exposure to others can be minimized by vacating the entire building of persons other than the spray foam application team during SPF application and for a period of time following installation. For projects where this is not feasible or necessary, (e.g., large commercial buildings), take steps to keep other persons out of part of the building to be sprayed, and discourage entrance into the spray area by using warning/caution tape and/or signage.
- Shut down HVAC system, and temporarily seal off (e.g., plastic sheeting and tape) HVAC system components in the work area.
- Always follow the manufacturer's application instructions with respect to lift (layer or pass) thickness and time between lifts. Spraying foam too thickly in a single lift or not permitting sufficient time between lifts may generate excessive heat to the point where the foam may char, smolder, or burn.
- Ventilate the application area for a period of time following installation to purge aerosols and vapors from the structure (preferably via fans exhausting air at one side, and open windows/doors on the opposite side). The post-installation ventilation time will vary based on the size of the area, amount of foam applied, the particular foam formulation applied, ventilation rate, and other relevant factors.

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Discourage entrance by others during the ventilation period. Contact your SPF supplier for recommendations as to ventilation and reoccupancy time.

- Display prominent warning signs at all entrances to the work area identifying the fire dangers of open flames, welding, and sparks until a thermal barrier (e.g., drywall) is applied over the installed foam.
- General housekeeping and clean-up is an important part of the job. Conduct jobsite quality controls before, during and after a project (e.g. warning signs/tape, equipment/material staging). Dispose of waste materials in accordance with applicable regulatory requirements.

## How should spills be addressed?

- Direct all personnel away from the immediate area.
- Have individuals trained in spill clean-up don appropriate personal protective equipment.
- Absorb the spilled material with sand, earth or absorbent clays (e.g., vermiculite or cat litter). Place the absorbed material in drums (for MDI, use a neutralization solution (see MSDS), and do not seal these drums for an appropriate period (e.g., at least 72 hours).
- If a very large amount of MDI has been spilled (approximately 10,000 lbs of PMDI, or about 15 55-gallon drums), you must report the spill to various government agencies. In addition, contact CHEMTREC® (1-800-424-9300) for assistance.
- Comply with all applicable federal, state, and local waste disposal regulations, and dispose of accordingly.

## How should empty drums be disposed?

- Offer the empty drums to a qualified reconditioner.
- Offer the empty drums to a reclaimer for recycling (note: neutralization of empty PMDI drums is wise prior to transfer to the recycler).

- Empty the drums in accordance with the drum reconditioner's or recycler's instructions, as well as in accordance with state and federal regulations (e.g., less than 1" of liquid product in a drum is considered empty by the U.S. Environmental Protection Agency).

## Where can I get more information?

- American Chemistry Council (ACC):
  - ACC Center for the Polyurethanes Industry (CPI) websites:
    - [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) - Select "Safety" or "Health"
    - [www.americanchemistry.com/spf](http://www.americanchemistry.com/spf) or [www.spraypolyurethane.com](http://www.spraypolyurethane.com)
    - "Health & Safety Aspects of SPF Applications" DVD - 2002.
    - [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) - Select "Order Publications".
    - "Safe Handling of Diphenylmethane Diisocyanate (MDI)" - 2007. [www.spraypolyurethane.com](http://www.spraypolyurethane.com).
  - ACC Diisocyanates Panel (DII):
    - [http://www.americanchemistry.com/s\\_acc/sec\\_iso.asp?CID=1547&DID=5866](http://www.americanchemistry.com/s_acc/sec_iso.asp?CID=1547&DID=5866)
- Spray Polyurethane Foam Alliance (SPFA)
  - [www.sprayfoam.org](http://www.sprayfoam.org) - Select "Health & Safety"
- U.S. National Institute of Occupational Safety and Health (NIOSH)
  - [www.cdc.gov/niosh/topics/isocyanates](http://www.cdc.gov/niosh/topics/isocyanates) - Safety and Health Topic: Isocyanates
- Material Safety Data Sheets and other health and safety literature can be obtained by contacting your spray polyurethane foam supplier.

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This document was prepared by the American Chemistry Council (ACC) Center for the Polyurethanes Industry (CPI) and the Spray Polyurethane Foam Alliance (SPFA). It is intended to provide general information to persons who may handle or apply spray polyurethane foam chemicals. It is not intended to serve as a substitute for in-depth training or specific handling or application requirements, nor is it designed or intended to define or create legal rights or obligations. It is not intended to be a "how-to" manual, nor is it a prescriptive guide. All persons involved in handling and applying spray polyurethane foam chemicals have an independent obligation to ascertain that their actions are in compliance with current federal, state and local laws and regulations and should consult with their employer concerning such matters. Any mention of specific products in this document is for illustration purposes only and is not intended as a recommendation or endorsement of such products.

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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:

- **HARD HAT:** Use if needed to protect head from falling objects.
  - **EYE PROTECTION:** Must be worn when spraying or working in areas where spray polyurethane foam aerosol or mist is present. Eye protection can be provided by a full face mask design.
  - **SKIN PROTECTION:** Disposable coveralls are used to keep spray and mist from contacting skin and clothing. Disposable coveralls are not just for convenience - in rare circumstances, skin exposure to spray or mist may result in serious health concerns.
  - Fabric gloves fully coated in nitrile, neoprene, butyl, or PVC; or cotton gloves over nitrile gloves could be used for spraying. Tape may be used to seal arm and feet openings as needed.
  - If a breach of gloves or garments is noticed, change out the personal protective garments immediately or repair with tape over tears or rips.
  - **RESPIRATORY PROTECTION:** For interior applications, sprayers must wear a NIOSH-approved full face or hood-type Supplied Air Respirator or SAR. Helpers also may need an SAR. If working in close proximity to the sprayer in some cases, a full facepiece Air Purifying Respirator or APR with organic vapor/particulate (P100) cartridges may be used by helpers if adequate ventilation is provided or if outside the immediate overspray area.
  - **MAINTENANCE:** Employees should care for and maintain respirators as instructed 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 about:
- damaged or imperfect respirators
  - workplace hazards; and
  - questions about the Respiratory Protection Program
- **WORK BOOTS:** Steel-toed work boots are desirable in most work areas. Protection from overspray can be provided by disposable overboots with skid-resistant soles, if it does not compromise the grip of the work boot.
  - Always read and understand the spray polyurethane foam manufacturer's Material Safety Data Sheet or MSDS before starting any spray foam application.

ACTIVITY	Chemical Handling	Equipment Maintenance	Gun and Equipment Application	Interior SPF Application	Training and Cleanup
Safety Glasses with Side Shields or Safety Goggles	✓	✓	✓	✓	✓
Supplied Air Respirator (SAR); Full Face Mask or Hood				✓	
Air Purifying Respirator (APR); Organic Vapor Particulate (P100) Cartridge	✓				✓
Fabric Gloves Fully Coated in Nitrile, Neoprene, Butyl, or PVC; or Cotton Over Nitrile Gloves	✓	✓	✓	✓	✓
Disposable Coveralls	✓			✓	✓

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Spray Polyurethane Foam Alliance [www.sprayfoam.org](http://www.sprayfoam.org)

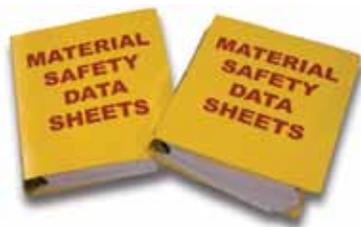


## Indoor Commercial and Residential Insulation Using Spray Polyurethane Foam Containing MDI/PMDI: Seven Important Points for Spray Polyurethane Foam Contractors

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 diphenyl 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 chemical’s many names, methylene diphenyl 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 product’s 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

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breathing. If you continue to be overexposed, you may become sensitized (i.e., allergic) to MDI. Once sensitized, the effects may start as soon as you begin to work with the product, or later on in the day after you've stopped working with the product (e.g., when you've left work). If you are sensitized, you may experience health effects even when airborne MDI levels are very low and may be at risk for experiencing an asthma attack. If this happens, **DO NOT CONTINUE TO WORK WITH MDI**; asthma attacks can be life-threatening. If you start to feel any of the symptoms listed above, let your supervisor know immediately and seek medical attention.

If you suspect someone has become overexposed, remove the person to an area with fresh air, and try to keep them calm and warm, but not hot. If they are having difficulty breathing, a qualified person may provide oxygen. If they stop breathing, have trained first-aid personnel give artificial resuscitation. Seek emergency medical attention.

**Skin Contact:** Getting MDI on your skin may result in allergic sensitization. In addition, animal tests have indicated that skin contact, followed by inhalation exposure, may result in lung sensitization. If these symptoms occur, seek immediate medical attention. Repeatedly getting MDI on your skin may cause discoloration, redness, and swelling or blistering; this also could lead to skin sensitization. It is best, therefore, to conduct your work to avoid skin contact, but if you get MDI on your skin, wash it thoroughly with soap and flowing water as soon as possible after exposure.



**Eye Contact:** Getting MDI in your eyes can be painful and could cause tearing and irritation. If you get MDI in your eyes, wash them immediately with a continuous flow of lukewarm, low pressure water, preferably from an eyewash station, for at least 15 minutes. Seek immediate medical attention.

**Ingestion:** Swallowing MDI can cause irritation. If you swallow MDI, do not induce vomiting. Wash out the

mouth with water. The person affected should be made to rest and seek immediate medical attention.

Additional information about these potential health hazards is available through the product's MSDS and in materials on the American Chemistry Council's Center for the Polyurethanes Industry (CPI) website at [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).

### 3. Protecting Yourself from MDI Exposure

With proper precautions and the use of personal protective equipment (PPE), you can protect yourself from overexposure to MDI during the application of the SPF system.

**A:** For tasks that do not involve spraying (such as equipment cleaning), but where you may have direct contact with MDI liquid (at room temperature), use:



- Safety glasses or goggles
- MDI-resistant chemical gloves (e.g., nitrile, neoprene, butyl, or PVC)
- MDI-resistant clothing (e.g., apron or coveralls)
- Safety shoes or boots



**B:** When spraying a spray polyurethane foam system indoors, sprayers and helpers should wear:



- A NIOSH-approved full face or hood-type supplied air respirator (SAR) (as outlined in your company's Respiratory Protection Program)\*

- Note: In some cases, such as when a work area is well ventilated or when helpers are not working in the immediate vicinity of the sprayer, helpers may be able to wear full face air purifying respirators (APR), with organic vapor/particulate (P100) cartridges instead of an SAR. Professional judgment must be exercised in making this determination, taking into consideration the specific circumstances of the job site/application.

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- Fabric gloves fully coated in nitrile, neoprene, butyl, or PVC; or cotton gloves over nitrile gloves. Helpers may wear nitrile, neoprene, butyl, or PVC gloves instead of the previously

mentioned glove types.

- Disposable coveralls with attached hood. Where heat stress may be a concern, consider the use of lightweight disposable coveralls.



- Disposable overboots with skid-resistant soles. Evaluate whether overboots are to be used by helpers, depending on site conditions. In circumstances where over

boots may create a slip/fall hazard, the use of overboots may be omitted.

For other tasks where there is the potential for exposure to MDI vapor/mist, follow the guidelines suggested in Point 3B. Workers not wearing the correct PPE should not enter the perimeter where spraying is occurring until the airborne MDI levels are below the allowable limits mentioned previously. Additional information to help protect you is available through the product's MSDS and in literature on the CPI website, [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).



#### 4. Wearing a Respirator

According to the Occupational Safety and Health Administration's (OSHA) Respiratory Protection Standard, you are required to have a

medical evaluation and receive medical approval before using a respirator. After approval is given, a fit test is required. The fit test is conducted using the respirator you will be wearing on the job. Each time you use a tight-fitting facepiece, you must conduct a 'user seal check'. However, tight-fitting facepiece respirators are not permitted for use if:

- You have facial hair that interferes with either the sealing surface of the respirator and the face, or interferes with the valve function;

- You wear corrective glasses/goggles or if other personal protective equipment interferes with the seal of the facepiece; and,
- Any other condition interferes with the facepiece seal.

Respirators should be regularly cleaned and disinfected according to the instructions provided by the respirator manufacturer. Deteriorated parts must be replaced prior to equipment use. Respirators should be inspected regularly for:

- Cracks, tears, holes, facemask distortion, cracked or loose lenses/face shield;
- Breaks, tears, broken buckles/clasps, over-stretched elastic bands in head strap;
- Residue/dirt, cracks or tears in valve and absence of valve flap; and,
- Breathing air quality/grade, condition of supply hoses, hose connections; settings on regulators and valves.

\*The level of respiratory protection provided by the supplied air system is dependent upon the facepiece that is chosen; therefore consult your company's Respiratory Protection Program and MSDS for guidance.

Take defective respirators or those with defective parts out of service immediately. Notify your supervisor about all respirator defects.

Additional information about respirators is available through the product's MSDS, in your company's Respiratory Protection Program, and in materials on the CPI website at [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).

#### 5. Containing the Overspray

When applying SPF indoors, marking the area with caution tape or other signage can help prevent workers from entering the spraying area. While this is a dynamic process which changes as each room is completed, it is possible to prevent entry into the spray area. In addition, depending on the weather and conditions of the job site (e.g., proximity to other buildings, vehicles,

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bystanders/passersby), ventilation of the application area may be necessary. For example, if a room has windows and/or doors on opposite sides, these can be opened to allow air to flow through the spray area. Other techniques for containing and ventilating the spray area also may be used. Further detail on these techniques is being developed and will be available in the near future. Adequate ventilation is especially important in confined areas such as attics and crawlspaces. Only fully protected workers, as described in Point 3B, will be allowed in the spray area.

Ventilation of the application area for a period of time following installation helps purge aerosols and vapors from the structure (preferably via fans exhausting air at one side, and open windows/doors on the opposite side). The post-installation ventilation time will vary based on the size of the area, amount of foam applied, the particular foam formulation applied, ventilation rate, and other relevant factors. Discourage entrance by others during the ventilation period. Contact your SPF supplier for recommendations as to ventilation and reoccupancy time.

## 6. Completing the Job

Remove PPE after completion of clean-up and exiting the spray area. Continue to wear while cleaning MDI-contaminated equipment and while handling any containers with MDI (e.g., drums, buckets). Point 3 provides guidance on PPE during clean-up.

It is good workplace practice to keep all work clothing at work. Any clothing contaminated with MDI should be removed and properly disposed of or decontaminated with a neutralizer solution (See the product's MSDS for the recommended neutralizer solution). Leather items cannot be decontaminated. Any contaminated leather items including shoes, belts, and watch bands or clothing, that have been exposed to MDI should be properly discarded. MDI is a reactive chemical; therefore, the MDI container should be kept sealed to reduce contamination. However, resealing MDI containers contaminated with water or polyol can cause a buildup of pressure in the container due to the

generation of carbon dioxide. A pressurized container may rupture. MDI can self-react in a fire or at very high temperatures and release carbon dioxide. Carbon dioxide can build pressure in sealed containers sufficient to cause rupturing of the container.

Additional information to help protect you is available through the product's MSDS and in materials on the CPI website at [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).

## 7. Responding to Emergencies

Fires, spills, and other emergencies involving MDI require an immediate response by trained and knowledgeable personnel. **If you have not been trained to respond to an emergency, leave the area immediately and notify the appropriate emergency response personnel. If you need additional guidance, CHEMTREC®, the Chemical Transportation Emergency Center, is available to provide assistance by telephone 24-hours a day in the event of an emergency involving a fire, leak, spill or personnel exposure. CHEMTREC's emergency number is 1-800-424-9300.**

The seven important points in this guidance document are exhaustive and do not identify all the safety measures or legal requirements that may apply to your particular worksite. Consult the supplier's MSDS for additional information.



**For more information, visit:**

**The American Chemistry Council's Center for the Polyurethanes Industry**

[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) or  
[www.spraypolyurethane.com](http://www.spraypolyurethane.com)

**Spray Polyurethane Foam Alliance**

[www.sprayfoam.org](http://www.sprayfoam.org)

## SECTION 4

# Exterior Spray Polyurethane Foam Applications

- Exterior Spray Polyurethane Foam Insulation Health and Safety Q&A
- Exterior Spray Polyurethane Foam Insulation – Personal Protective Equipment
- Exterior Commercial and Residential Insulation Using SPF Containing MDI/PMDI: Seven Important Points for SPF Contractors

## 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

companion Interior Spray Polyurethane Foam Insulation Health & Safety Q&A document (describing spray applications done on the inside 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. This document is for both new and existing exterior applications. 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 “Iso”:** Also known as polymeric methylene diphenyl diisocyanate or “PMDI” and typically contains 50% MDI and 50% higher molecular weight oligomers of MDI.

**B-Side or “Resin”:** 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 (allergy). Symptoms include reddening, itching, swelling, and rash. Skin contact alone may lead to respiratory sensitization. Eye contact can cause reddening, tearing, 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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Due to the potential health hazards just mentioned, it is important to avoid inhalation of, and skin and eye contact with SPF chemicals.



## What type of PPE should applicators wear during spraying?

- NIOSH-approved air purifying respirator (APR) with combination organic vapor/particulate (P100) cartridges, or a supplied air respirator (SAR).

**Note:** Respirators should be used in accordance with your company's written Respiratory Protection Program (RPP), which is required by the U.S. Occupational Safety & Health Administration (OSHA). Among other items, the RPP should include provisions for medical evaluations, fit testing, training, and cartridge change-out schedule.



- Disposable coveralls. It is important that all exposed skin be covered. Where heat stress may be a concern, consider the use of lightweight disposable coveralls.
- Disposable over-boots with skid-resistant soles. In circumstances where over-boots may create a slip/fall hazard, their use may be omitted.
- Fabric gloves fully coated with nitrile, neoprene, butyl, or PVC. Alternatively, cotton gloves over nitrile gloves may be used.



- Where a full face respirator is not used, safety glasses with side shields or chemical safety goggles.

## What type of PPE should helpers wear while spraying is being conducted?

Helpers directly assisting the sprayer (e.g., holding windscreens, hoses, etc.), should wear the same PPE worn by the sprayer.

## What type of PPE should be worn during handling of liquid SPF chemicals?

The type of PPE used will depend on the particular activity and the associated potential for exposure. The following suggestions are offered as general guidance.



- Chemical safety goggles



- Nitrile, neoprene, butyl, or PVC gloves



- If splash to the body is possible, impermeable protective clothing (e.g., PVC, polyethylene)



- If handling heated SPF chemicals, NIOSH-approved air purifying respirator with combination organic vapor/particulate (P100) cartridges

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## What type of personal protective equipment should be worn during handling of solvents?

Consult the manufacturer's MSDS.

## What are the first-aid measures?

First-aid measures can be found on the MSDS. Here are some typical first-aid suggestions:

### Inhalation

- Move the individual to fresh air.
- Administer CPR and/or oxygen if needed.
- Seek immediate medical attention.

### Eyes

- Flush with lukewarm water for at least 15 minutes.
- Seek medical attention.

### Skin

- Remove contaminated clothing.
- Wash thoroughly with soap and water.
- Seek medical attention if irritation develops or persists.

### Ingestion

- Do not induce vomiting.
- If conscious, rinse mouth with water.
- Seek medical attention.

## What are some good work practices to follow?

- Have the most current MSDS for each chemical brought onto the jobsite readily available (e.g., keep in the spray rig)
- Prior to the start of each job, it is advisable to have a discussion with the building owner and/or occupant(s) to talk about items such as potential odors associated with the newly-installed foam and any other questions the owner/occupant may have, such as reoccupancy times.
- Develop an Overspray Mitigation Plan
  - Determine in advance the potential for overspray issues
  - Discuss any overspray potential with the building owner and make necessary arrangements to relocate vehicles
  - Protect other surfaces that could be damaged from overspray (e.g., windows, doors, equipment, or building exterior) as appropriate

- Do not spray polyurethane foam or coatings in higher winds (e.g., wind speeds exceeding 15 mph)
- Use of windscreens in winds less than 15 mph can minimize impact of overspray
- Have a plan in-place for when overspray damages do occur
- Train all employees in overspray prevention
- Shut down HVAC system, and temporarily seal off (e.g., plastic sheeting and tape) roof-top air intakes
- Always follow the manufacturer's application instructions with respect to lift (layer or pass) thickness and time between lifts. Spraying foam too thickly in a single lift or not permitting sufficient time between lifts may generate excessive heat to the point where the foam may char, smolder, or burn.
- General housekeeping and clean-up is an important part of the job. Conduct jobsite quality controls before, during and after a project (e.g. warning signs/tape, equipment/material staging). Dispose of waste materials in accordance with applicable regulatory requirements.

## How should spills be addressed?

- Direct all personnel away from the immediate area.
- Have individuals trained in spill clean-up don appropriate personal protective equipment.
- Absorb the spilled material with sand, earth or absorbent clays (e.g., vermiculite or cat litter). Place the absorbed material in drums (for MDI, use a neutralization solution (see MSDS), and do not seal these drums for an appropriate period (e.g., at least 72 hours).
- If a very large amount of MDI has been spilled (approximately 10,000 lbs of PMDI, or about 15 55-gallon drums), you must report the spill to various government agencies. In addition, contact CHEMTREC® (1-800-424-9300) for assistance.
- Comply with all applicable federal, state, and local waste disposal regulations, and dispose of accordingly.

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## How should empty drums be disposed?

- Offer the empty drums to a qualified reconditioner.
- Offer the empty drums to a reclaimer for recycling (note: neutralization of empty PMDI drums is wise prior to transfer to the recycler).
- Empty the drums in accordance with the drum reconditioner's or recycler's instructions, as well as in accordance with state and federal regulations (e.g., less than 1" of liquid product in a drum is considered empty by the U.S. Environmental Protection Agency).

## Where can I get more information?

- American Chemistry Council (ACC):
  - ACC Center for the Polyurethanes Industry (CPI) websites:
    - [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) - Select "Safety" or "Health"
    - [www.americanchemistry.com/spf](http://www.americanchemistry.com/spf) or [www.spraypolyurethane.com](http://www.spraypolyurethane.com)
    - "Health & Safety Aspects of SPF Applications" DVD - 2002.  
[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) - Select "Order Publications".
    - "Safe Handling of Diphenylmethane Diisocyanate (MDI)" - 2007.  
[www.americanchemistry.com/spf](http://www.americanchemistry.com/spf) or [www.spraypolyurethane.com](http://www.spraypolyurethane.com).
  - ACC Diisocyanates Panel (DII):
    - [http://www.americanchemistry.com/s\\_acc/sec\\_iso.asp?CID=1547&DID=5866](http://www.americanchemistry.com/s_acc/sec_iso.asp?CID=1547&DID=5866)
- Spray Polyurethane Foam Alliance (SPFA)
  - [www.sprayfoam.org](http://www.sprayfoam.org) - Select "Health & Safety"
- U.S. National Institute of Occupational Safety and Health (NIOSH)
  - [www.cdc.gov/niosh/topics/isocyanates](http://www.cdc.gov/niosh/topics/isocyanates) - Safety and Health Topic: Isocyanates
- Material Safety Data Sheets and other health and safety literature can be obtained by contacting your spray polyurethane foam supplier.

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# EXTERIOR SPRAY POLYURETHANE FOAM (SPF) PERSONAL PROTECTIVE EQUIPMENT



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

- **HARD HAT:** Use if needed to protect head from falling objects.
- **EYE PROTECTION:** Must be worn when spraying or working in areas where spray polyurethane foam aerosol or mist is present. Eye protection can be provided by a full face mask design or separate safety glasses with side shields or chemical safety goggles if a half face respirator is selected for use.
- **SKIN PROTECTION:** Protective garments are used to keep spray and mist from contacting skin and clothing. Personal protective garments are not just for convenience – in rare cases, skin exposure to spray or mist may result in serious health concerns.
- Fabric gloves fully coated in nitrile, neoprene, butyl, or PVC; or cotton over nitrile gloves could be used for spraying. Tape may be used to seal arm and feet openings as needed.
- If a breach of gloves or garments is noticed, change out the personal protective garments immediately or repair with tape over tears or rips.
- **RESPIRATORY PROTECTION:** Exterior applications by definition are conducted in open air and typically have air movement minimizing SPF aerosol concentrations. For exterior applications, sprayers must wear a NIOSH-approved Air Purifying Respirator or APR with an organic vapor/particulate (P100) cartridge. A NIOSH approved Supplied Air Respirator or SAR, if chosen, may provide greater protection for sprayers. Overspray should be monitored to avoid problems with objects, animals or unprotected persons downwind of the sprayer. All spray areas should be posted with warning signs/tape.
- **MAINTENANCE:** Employees should care for and maintain respirators as instructed 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 about:

- damaged or imperfect respirators
- workplace hazards; and
- questions about the Respiratory Protection Program



- **WORK BOOTS:** Steel-toed work boots are desirable in most work areas. Protection from overspray can be provided by disposable overboots with skid-resistant soles, if it does not compromise the grip of the work boot.
- Always read and understand the spray polyurethane foam manufacturer's Material Safety Data Sheet or MSDS before you start any spray foam application.



ACTIVITY	Chemical Handling	Equipment Maintenance	Gun and Equipment Maintenance	EXTERIOR SPF Application
Safety Glasses with Side Shields or Safety Goggles			✓	✓
Supplied Air Respirator (SAR); Full Face Mask or Hood	✓			
Air Purifying Respirator (APR); Organic Vapor Particulate (P100) Cartridge				✓
Fabric Gloves Fully Coated in Nitrile, Neoprene, Butyl, or PVC; or Cotton Over Nitrile Gloves	✓	✓	✓	✓
Disposable Coveralls	✓			✓



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Spray Polyurethane Foam Alliance [www.sprayfoam.org](http://www.sprayfoam.org)



## 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 diphenyl diisocyanate (MDI) and/or polymeric MDI (PMDI) to exterior applications.

This document provides guidance to spray polyurethane foam (SPF) contractors about important health and safety aspects when working with MDI during the spraying of polyurethane foam. Although MDI is a commonly used material in the spraying of exterior applications such as roofs and tanks, it is not the only material in the system that can present health hazards. SPF systems also contain a “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 the information contained in your supplier’s Material Safety Data Sheet (MSDS) for the particular SPF product you are using. MSDSs are the primary sources of extensive and specific information on MDI, PMDI and other SPF system ingredients.

This guidance document is intended to help SPF companies applying SPF to exterior applications 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; always follow the product-specific information in the MSDS.



### 1. What is MDI?

The acronym MDI was derived from one of the chemical’s many names, methylene diphenyl 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 referred to as the “A-side” or the “iso-side” of the system. Although the use of SPF insulates and protects exterior applications, the actual spraying application 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 product’s 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

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irritate your nose and lungs. With overexposure, you may feel tightness in your chest and have difficulty breathing. If you continue to be overexposed, you may become sensitized (i.e., allergic) to MDI. Once sensitized, the effects may start as soon as you begin to work with the product, or later on in the day after you've stopped working with the product (i.e., when you've left work). If you are sensitized you may experience health effects even when airborne MDI levels are very low and may be at risk for experiencing an asthma attack. If this happens, DO NOT CONTINUE TO WORK WITH MDI; asthma attacks can be life-threatening. If you start to feel any of the symptoms listed above, let your supervisor know immediately and seek medical attention.

If you suspect someone has become overexposed, remove the person to an area with fresh air, and try to keep them calm and warm, but not hot. If they are having difficulty breathing, a qualified person may provide oxygen. If they stop breathing, have trained first aid personnel give artificial resuscitation. Seek emergency medical attention.

**Skin Contact:** Getting MDI on your skin may result in allergic sensitization. In addition, animal tests have indicated that skin contact, followed by an inhalation exposure, may result in lung sensitization. If these symptoms occur seek immediate medical attention. Repeatedly getting MDI on your skin may cause discoloration, redness, and swelling or blistering; this also could lead to skin sensitization. It is best, therefore, to conduct your work to avoid skin contact, but if you get MDI on your skin, wash it thoroughly with soap and flowing water as soon as possible after exposure.



**Eye Contact:** Getting MDI in your eyes can be painful and could cause tearing and irritation. If you get MDI in your eyes, wash them immediately with a continuous flow of lukewarm, low pressure water, preferably from an eyewash station, for at least 15 minutes. Seek immediate medical attention.

**Ingestion:** Swallowing MDI can cause irritation. If you swallow MDI, do not induce vomiting. Wash out the mouth with water. The person affected should be made to rest and seek immediate medical attention. Additional information about these potential health hazards is available through the product's MSDS and in materials on the American Chemistry Council's Center for the Polyurethanes Industry (CPI) website at

### 3. Protecting Yourself from MDI Exposure

With proper precautions and the use of personal protective equipment (PPE), you can protect yourself from overexposure to MDI during the application of SPF on exterior applications.

**A:** For tasks that do not involve spraying (such as equipment cleaning), but where you may have direct contact with MDI liquid (at room temperature), use:

- Safety glasses or goggles
- MDI-resistant chemical gloves (e.g., nitrile, neoprene, butyl, or PVC)
- MDI-resistant clothing (e.g., apron or coveralls)
- Safety shoes or boots



**B:** When spraying an exterior application (e.g., roofs, tanks, top coatings), both sprayers and helpers directly assisting the sprayer (e.g. holding windscreens, hoses), should wear:

- A NIOSH-approved air purifying respirator (APR) with organic vapor/particulate (P100) cartridges or a supplied air respirator (SAR), as outlined in your company's Respiratory Protection Program.\*
- Safety goggles (where respirator does not cover the eyes).
- Fabric gloves fully coated in nitrile, neoprene, butyl, or PVC; or cotton gloves over nitrile gloves.
- Disposable coveralls. Where heat stress may be a concern, consider the use of lightweight disposable coveralls

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- Disposable overboots with skid-resistant soles. In circumstances where over-boots may create a slip/fall hazard, their use may be omitted.

For other tasks where there is the potential for exposure to MDI vapor/mist, follow the guidelines suggested in Point 3B. Workers not wearing the correct PPE should not enter the perimeter where spraying is occurring until the airborne MDI levels are below the allowable limits mentioned previously. Additional information to help protect you is available through the product's MSDS and in literature on the CPI website at [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).



#### 4. Wearing a Respirator

According to the U.S. Occupational Safety and Health Administration's Respiratory Protection Standard, you are required to

have a medical evaluation and receive medical approval before using a respirator. After approval is given, a fit test is required. The fit test is conducted using the respirator you will be wearing on the job. Each time you use a tight-fitting facepiece, you must conduct a 'user seal check'. However, tight-fitting facepiece respirators are not permitted for use if:

- You have facial hair that interferes with either the sealing surface of the respirator and the face, or interferes with the valve function;
- You wear corrective glasses/goggles or if other personal protective equipment interferes with the seal of the facepiece; and,
- Any other condition interferes with the facepiece seal.

Respirators should be regularly cleaned and disinfected according to the instructions provided by the respirator manufacturer. Deteriorated parts must be replaced prior to equipment use. Respirators should be inspected regularly for:

- Cracks, tears, holes, facemask distortion, cracked or loose lenses/face shield;
- Breaks, tears, broken buckles/clasps, over-stretched elastic bands in head strap;

- Residue/dirt, cracks or tears in valve and absence of valve flap; and,
- Breathing air quality/grade, condition of supply hoses, hose connections; settings on regulators and valves.

\*The level of respiratory protection provided by the supplied air system is dependent upon the facepiece that is chosen; therefore consult your company's Respiratory Protection Program and MSDS for guidance.

Take defective respirators or those with defective parts out of service immediately. Notify your supervisor about all respirator defects.

Additional information about respirators is available through the product's MSDS, in your company's Respiratory Protection Program, and in materials on the CPI website, [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).

#### 5. Containing the Overspray

When applying SPF to an exterior application, care must be taken to shield spray mists or vapors from entering the building air intake ventilation system. A typical approach is first, turn off the building ventilation system. Second, apply plastic sheeting (generally polyethylene) over the air intakes to seal and secure them. Third, protect overspray from coating cars or equipment below with SPF particles. All workers applying SPF to an exterior application during spraying (as well as any other workers in the vicinity) should be upwind from the application of SPF. Only fully protected workers, as outlined in Point 3B, will be allowed in the spray area. Remember, the coatings applied over the exterior application also may contain chemicals of concern. Check each coating manufacturer's MSDS for information on potential health hazards and PPE recommendations.

#### 6. Completing the Job

Remove PPE after completion of clean-up and exiting the spray area. Continue to wear PPE while cleaning MDI-contaminated equipment and while handling any containers with MDI (e.g., drums, buckets). Point 3 provides guidance on PPE during clean-up.

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It is good workplace practice to keep all work clothing at work. Any clothing contaminated with MDI should be removed and properly disposed of or cleaned. Leather items cannot be decontaminated. Any contaminated leather items including shoes, belts, and watch bands or clothing, which have been exposed to MDI, should be properly discarded. MDI is a reactive chemical; therefore, the MDI container should be kept sealed to reduce contamination. However, resealing MDI containers contaminated with water or polyol can cause a buildup of pressure in the container due to the generation of carbon dioxide. A pressurized container may rupture. MDI can self-react in a fire or at very high temperatures and release carbon dioxide. Carbon dioxide can build pressure in sealed containers sufficient to cause rupturing of the container.

Additional information to help protect you is available through the product's MSDS and in materials on the CPI website at [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane).



## 7. Responding to Emergencies

Fires, spills, and other emergencies involving MDI require an immediate response by trained and knowledgeable personnel. **If you have not been trained to respond to an emergency, leave the area immediately and notify the appropriate emergency response personnel. If you need additional guidance, CHEMTREC®, the Chemical Transportation Emergency Center, is available to provide assistance by telephone 24-hours a day in the event of an emergency involving a fire, leak, spill or personnel exposure. CHEMTREC's emergency number is 1-800-424-9300.**

The seven important points in this guidance document are exhaustive and do not identify all the safety measures or legal requirements that may apply to your particular worksite. Consult the supplier's MSDS for additional information.

**For more information, visit:**

**The American Chemistry Council's Center for the Polyurethanes Industry**

[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) or  
[www.spraypolyurethane.com](http://www.spraypolyurethane.com)

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## SECTION 5

# Marketing Claims

- “Green” Marketing Claims and Spray Polyurethane Foam

## “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 outstanding 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 that 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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## **Is there guidance to help explain how to make a “green claim?”**

Yes. The Federal Trade Commission (FTC), together with the Environmental Protection Agency (EPA), developed guidelines for advertisers to ensure that their environmental marketing claims don't mislead consumers. These are called the “Green Guides,” and they explain how the FTC Act is enforced when it comes to environmental claims.

Analyzing any marketing claim is generally a two step process. First, ask what claims — express and implied — does the marketing or advertising convey to reasonable consumers? Second, ask whether there is “competent and reliable evidence” — which, depending on the claim, may require scientific evidence — to support each of the claims. The Green Guides helps marketers understand how to do this analysis.

## **What marketing claims do the Green Guides apply to?**

The Green Guides apply to all forms of marketing for products and services: advertisements, labels, package inserts, promotional materials, words (including sales “pitches” at trade shows and conventions and one on one sales calls to buyers, consumers, or customers), symbols, logos, product brand names, and marketing through digital or electronic media (including Internet “YouTube” videos, blogs, web pages, social networking sites, Twitter, and email). They apply to any claim, express or implied, about the environmental attributes of a product, package or service in connection with the sale, offering for sale or marketing of the product, package or service for personal, family or household use, or for commercial, institutional or industrial use.

## **Is there difference between a green marketing claim and product use and application instructions?**

Yes. A marketing claim often points out a particular product feature benefit; for example, a marketing claim may point out that a product is made using a renewable, plant-based resource. But a marketing claim should not be confused with instructions on how to safely use and apply the product. Application and Use Instructions should always be consulted, including the Material Safety Data Sheet (MSDS), manufacturer's instructions, and label instructions.

## **If I make an environmental marketing claim, do I have to be able to “back up” the claim?**

Yes. This is called claims substantiation, and all marketers making express or implied claims about the attributes of their product, package or service must be able to substantiate the claim at the time they make it (in other words, that means there is a reasonable basis for making the claim). In the case of environmental marketing claims, such substantiation will often require competent and reliable scientific evidence, defined as tests, analyses, research, studies or other evidence based on the expertise of professionals in the relevant area, conducted and evaluated in an objective manner by persons qualified to do so, using procedures generally accepted in the profession to yield accurate and reliable results.

### **Example 1:**

A spray polyurethane foam (SPF) product is advertised as containing “90% recycled content.” The SPF kit is sold with chemical mixtures pre-packaged in two “sides,” an “A” side and a “B” side, each side making up 50% of the kit. Twenty percent of the B side is made up of polyols, and the polyols have 90% recycled content. The A side and B side are mixed at the application site to create the finished foam. After the sides are mixed and the finished foam is produced, the ultimate recycled content in the SPF is only 9%. The “90% recycled content” claim for the finished foam is deceptive because consumers could reasonably believe that a majority of the finished spray polyurethane foam consists of recycled content. On the other hand, an appropriately qualified claim, e.g., “contains 9% recycled content in the finished foam,” addresses this issue. In addition, the claim should be able to be adequately substantiated, so further qualifying the claim, “as measured using ASTM D6866,” would be acceptable as it discloses the actual, substantiated percentage of recycled content in the finished foam.

## **Can I make a general claim that a product is “green”?**

An unqualified general claim of environmental benefit may convey that the product has far-reaching environmental benefits, when it doesn't. The FTC may consider such an unqualified general claim to be

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deceptive. For example, a car manufacturer that made an unqualified general claim of a “green” car simply because it had eliminated VOCs in a paint formula (only one environmental attribute of many of the car) might be subject to challenge as making a deceptive claim.

Products generally advertised as “green” are likely to convey to consumers a broad range of environmental attributes. Under the Green Guides, such a claim would be less likely to be considered deceptive if it is accompanied by clear and prominent qualifying language that limits the green representation to the particular product attribute that can be substantiated, provided that the context doesn't create any other deceptive implications.

## **What about claims that a product is “non-toxic”?**

Consumers understand claims that a product is “non-toxic,” “essentially non-toxic,” or “practically non-toxic” to mean that the toxicity claims apply not only to human health effects, but also to environmental effects. The manufacturer of the product will determine whether a product can be called “non-toxic” based on its judgment after reviewing animal / environmental data, or human experience. Such classification may be used on toxicity / hazard information contained in Material Safety Data Sheets (MSDS), toxicity studies, and / or opinion from certified toxicologists or industrial hygiene (IH) professionals. A properly qualified “green” marketing claim about a particular product attribute, such as renewable content in a product, should never be confused with the toxicity profile of a product and never be solely relied upon for purposes of making a claim that a product is “non-toxic.”

Under the Federal Hazardous Substances Act (FHSA), a consumer product meeting the definition of hazardous household product (“hazardous substances”), must also bear cautionary labeling to alert consumers to the potential hazards that the product presents and to inform consumers of the measures they need to protect themselves from those hazards. Any consumer product that is toxic, corrosive, flammable or combustible, an irritant, a strong sensitizer, or that generates pressure through decomposition, heat, or other means requires labeling, if the product may cause substantial personal

injury or substantial illness during or as a proximate result of any customary or reasonable foreseeable handling or use, including reasonable foreseeable ingestion by children.

## **Are there special rules for claims about the energy efficiency of SPF?**

Yes. FTC has a regulation called the “R Value Rule,” which applies to the labeling and advertising of home insulation products. 16 C.F.R. 460.

<http://www.ftc.gov/bcp/rulemaking/rvalue/16cfr460.shtm>.

The rule has very broad application, and applies not just to the manufacturers of insulation, but also to any member of the home insulation industry, including insulation installers and home builders. Any claims about the R-value (the measure of resistance to heat flow) or energy savings of SPF should be carefully scrutinized for compliance with the rule.

## **Can different claims be made about spray foam chemicals before they are mixed and applied, as opposed to the finished, cured foam?**

The chemical hazard characteristics of the pre-mix, which has an “A” side and a “B” side of certain chemicals, are quite different than those of post-mix (reacted), finished and cured foam. Care should be taken to understand this distinction when making or interpreting marketing claims.

### **Example 2:**

A spray polyurethane foam (SPF) brochure advertises the spray foam product as “safe and non-toxic.” The SPF is produced by reacting hazardous liquid chemicals that have certain toxicity characteristics according to the material safety data sheets, and require personal protective equipment when being handled. However, the manufacturer has determined that after the SPF chemicals are mixed and installed, that the finished, cured, solid SPF product is non-toxic (using industry accepted tests) 24 hours after installation. The general, unqualified claim made in the advertising brochure may be deceptive if it is likely to be interpreted by consumers to mean that SPF in any form does not present any toxicity risks, and can be handled in any manner. A properly qualified claim that distinguishes between the characteristics of the pre-mix

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chemicals and the fully cured foam, however, is unlikely to be considered deceptive, e.g., that “Liquid SPF chemicals are hazardous and must be handled and installed using personal protective equipment. The fully cured solid SPF product may not be considered non-toxic until 24 hours after installation.”

## Sources of additional information:

### FTC Act Section 5:

[http://www.law.cornell.edu/uscode/15/usc\\_sec\\_15\\_00000045-000-.html](http://www.law.cornell.edu/uscode/15/usc_sec_15_00000045-000-.html)

### The Green Guides:

<http://www.ftc.gov/bcp/grnrule/guides980427.htm>

### FTC Policy Statement on Deception:

<http://www.ftc.gov/bcp/policystmt/ad-decept.htm>

### FTC Policy Statement on Unfairness:

<http://www.ftc.gov/bcp/policystmt/ad-unfair.htm>

### FTC Policy on Ad Substantiation:

<http://www.ftc.gov/bcp/guides/ad3subst.htm>

### Federal Hazardous Substances Act:

<http://www.cpsc.gov/BUSINFO/fhsa.pdf>

## For more information, visit:

### The American Chemistry Council's Center for the Polyurethanes Industry

[www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane) or  
[www.spraypolyurethane.com](http://www.spraypolyurethane.com)

### Spray Polyurethane Foam Alliance

[www.sprayfoam.org](http://www.sprayfoam.org)

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