

## 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.

Published October 1, 2009. This document may be updated. For the most current version of this document, see [www.americanchemistry.com/polyurethane](http://www.americanchemistry.com/polyurethane), [www.spraypolyurethane.com](http://www.spraypolyurethane.com), or [www.sprayfoam.org](http://www.sprayfoam.org).

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