GOVERNMENT CONCERNS AND INDUSTRY’S (SPFA/CPI) RESPONSE

The comments and opinions in this presentation do not necessarily represent or reflect those of SPFA.
Why Is the Federal Workgroup Concerned?

- SPF components are hazardous
  - Side A: Diisocyanates (MDI)
  - Side B: Amine catalysts, flame retardants and blowing agents
- SPF application in buildings requires safe practices for workers and occupants; consistent application
- Consumers need information on safe practices
- Residential DIY spray foam poses special challenges
- Marketing should fully inform consumers of SPF attributes without misleading claims.
Product Stewardship Goals

- Improve availability of accurate and comprehensive hazard & risk information
- Develop and communicate improved “Best Practices” to prevent exposures
- Address and eliminate inaccurate or misleading marketing claims
- Conduct research to address exposure assessment and data gaps
Key Challenges Going Forward

- How to quickly communicate hazard /safety information to workers and occupants?
  - SPFA and CPI have developed information that is on each website.

- How can practices be enhanced to improve protection?
  - Role of engineering controls and ventilation
  - Potential value of SPF worksite management plans?
  - Occupant re-entry considerations?

- How do we protect DIYs?

- How to augment health and safety training?
  - Value of applicator certification

- How do we mutually address research needs?
MSDS – current deficiencies and inconsistencies

- Hazard and exposure control information varies widely.
- Recommendations on respiratory protection vary.
- Only a few MSDSs mention the possible need for respiratory protection for “adjacent workers.”
- MSDSs indicate that adequate ventilation is needed but provide no guidance or suggestions on ventilation methods or what constitutes adequate ventilation.
- Few MSDSs mention that skin contact may cause an allergic reaction/sensitization.
- Several MSDSs mention that dust can be generated during cutting or abrasive processes, however, hazards are identified as “mechanical irritation” and do not mention the possible presence of MDI.
Hazard Communication

Literature is available on the web
Hazard Communications

Employer Responsibility

- Develop a written HazCom program
- Provide a List of Hazardous Chemicals
- Ensure Accessibility to MSDSs
- Provide proper PPE for each job
- Provide Employee Training

Guidance Document

center for the polyurethanes industry • spray polyurethane foam alliance

Hazard Communication for Spray Polyurethane Foam Insulation Applications

OSHA Standard 29 CFR 1926

Overview
The Standard was designed to provide employees with information on:
- The hazards and idiosyncrasies of all chemicals used in the workplace.
- Protective measures against adverse effects from use and handling including personal 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 training in a language for all employees that 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 workplace. 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 in each workplace.
- 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 promptly conducting non-standard work practices.
- Procedures for assuring containers and other hazardous materials are informed in the workplace.
Hazard Communications

Worker Responsibility

- Read the entire MSDS
- Be knowledgeable of the chemicals you are using
- Understand the hazards
- Use the correct PPE
- Be prepared in the event of an upset situation

### MSDS Awareness

<table>
<thead>
<tr>
<th>Sections 1, 2, 3*</th>
<th>CHEMICAL IDENTIFICATION HAZARD WARNINGS COMPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do you know the hazards of every chemical you are handling?</td>
</tr>
<tr>
<td></td>
<td>Component A (Sorbent), Component B (Resin), Polyol, Amine Catalyst, Blowing Agent, Fire Retardant, Solvents, Cleaning solvents, Coatings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sections 4*</th>
<th>PERSONAL PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Are you using the correct Personal Protection Equipment for the job?</td>
</tr>
<tr>
<td></td>
<td>Supplied Air/Respirator, Eye Protection, Gloves, Coveralls, Boots</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sections 6 &amp; 7</th>
<th>ACCIDENTAL RELEASES STORAGE AND HANDLING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Are you trained and handling the chemicals as directed?</td>
</tr>
<tr>
<td></td>
<td>Do you know how to properly contain and clean a spill?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sections 8</th>
<th>FIRST-AID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What should you do if there is an accidental exposure?</td>
</tr>
<tr>
<td></td>
<td>Do you have first aid procedures?</td>
</tr>
<tr>
<td></td>
<td>Do you have first aid materials at the work site?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sections 5, 6-6*</th>
<th>OTHER INFORMATION &quot;READ THE ENTIRE MSDS&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Did you know that other information is provided on an MSDS?</td>
</tr>
<tr>
<td></td>
<td>Fire-Fighting Measures, Physical-Chemical Properties, Stability and Reactivity, Toxicology, Disposal, Transportation, Regulatory Information</td>
</tr>
</tbody>
</table>

*Manufacturer's instructions and warnings follow the information in the MSDS, with the exception of information that is not provided on the MSDS.
### Summary of Potential Health Effects of Overexposure to SPF Chemicals

<table>
<thead>
<tr>
<th></th>
<th>Respiratory Tract</th>
<th>Eyes</th>
<th>Skin</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-Side / MDI</strong></td>
<td>Irritation.</td>
<td>Irritation</td>
<td>Irritation. Sensitization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensitization</td>
<td></td>
<td>(asthma)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Irritation. Sensitization</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(allergy)</td>
<td></td>
</tr>
<tr>
<td><strong>B-Side / Polyol Blend</strong></td>
<td>Irritation</td>
<td>Irritation. Hazy/Halo Vision</td>
<td>Irritation</td>
<td>Irregular Heartbeat (blowing agent)</td>
</tr>
</tbody>
</table>
MDI Sensitization

- Can no longer work with isocyanates, as sensitization can be permanent.
- Once sensitized, continued exposure may lead to a chronic respiratory condition wherein other agents, such as dust, other irritants, and/or cold air may cause asthmatic responses.
- Once sensitized, continued exposure may lead to more severe asthma attacks, which can be life threatening.
Air Monitoring Data

- Battery-Powered air sampling pump worn by worker or placed in area

- Sampling media submitted to laboratory for analysis.
## Air Monitoring Data

- **10 studies, 240+ task and shift samples**

<table>
<thead>
<tr>
<th></th>
<th>MDI Conc. ($\mu$g/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All samples</td>
</tr>
<tr>
<td><strong>Applicators</strong></td>
<td>5 - 2100</td>
</tr>
<tr>
<td><strong>Helpers</strong></td>
<td>0.1 - 408</td>
</tr>
<tr>
<td><strong>Exposure Guidelines</strong></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (ceiling)</td>
</tr>
</tbody>
</table>

Data compiled by Spence Consulting, LLC October 2009
Air Monitoring Data

Airborne MDI Concentrations - Applicator and Helpers

Survey No. | Concentration (ug/m³)
---|---
1 | OEL 51 ug/m³
2 | Near OEL
3 | Near OEL
4 | Above OEL
5 | Near OEL

Source: Bayer MaterialScience.
Note that airborne amine catalysts and blowing agent were also identified.
Air Monitoring Data

Short-Term Airborne MDI Concentrations - Applicator

Survey No. | Concentration (ug/m³) | OEL 200 ug/m³
--- | --- | ---
1 | 800 | 200
2 | 400 | 200
3 | 100 | 200
4 | 150 | 200
5 | 900 | 200

Source: Bayer MaterialScience
Personal Protective Equipment

Literature is available on the web
Eye and Face Protection
29 CFR 1910.138(b)(7)
Employees shall be provided with eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical, or radiation agents.

CP/OSHA
Sprayer: Exterior: Safety goggles (where respirator does not cover the eyes)
Non-Sprayer: Chemical safety glasses or goggles

Hand Protection
29 CFR 1910.138(b)
Employees shall select and require employees to use appropriate hand protection when employees’ hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremities.

CP/OSHA
Sprayer & Helper (Interior/Exterior): MX-resistant chemical gloves (e.g., nitrile), or fabric gloves coated in nitrile, neoprene, butyl, or PVC.
Non-Sprayer: Dependent on activity and location.

Occupational Foot Protection
29 CFR 1910.138(a)
The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee’s feet are exposed to electrical hazards.

CP/OSHA
Sprayer & Helper (Interior/Exterior): Safety shoes or boots. On possible overboots, provide that they do not present a slip/fall hazard.
Non-Sprayer: Safety shoes or boots.

Respiratory Protection
29 CFR 1910.134(b)(6)
A respirator shall be provided to each employee when such equipment is necessary to protect the health of such employee. The employer shall provide the respirators, which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program, which shall include the requirements outlined in paragraph (c) of this section. The program shall cover each employee required by this section to use a respirator. See OSHA Quick Card on page 2.

CP/OSHA
Sprayer & Helper (Interior): A NIOSH-approved full face or hood-type supplied air respirator (SAR) (as outlined in your company’s Respiratory Protection Program).
Sprayer & Helper (Exterior): 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.
Non-Sprayer: NIOSH-approved air-purifying respirator with combination organic vapor/particulate (P100) cartridges, if handling heated SPF chemicals.

Protective Clothing
CP/OSHA
Sprayer & Helper (Interior): Disposable full body suit with hood.
Sprayer & Helper (Exterior): Disposable full body suit with hood.
Non-Sprayer: Dependent on activity and location.

Additional PPE:
Fall Protection Systems Criteria and Practices
29 CFR 1926.501(b)(1)
“Unprotected sides and edges.” Each employee on a walking/ working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems. See OSHA Quick Card on page 2.

Head Protection
29 CFR 1926.100(a)
Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.
PPE for Spray Foaming

Respiratory Protection

- **Interior**
  - Hood-type or full face Supplied Air Respirators (SAR) for both sprayer and helper – locate air source outside of the spray area
  - In some cases, Air Purifying Respirator (APR) with organic vapor/particulate (P100) cartridges for helper (e.g., large commercial building with high ceilings and open floor plan)

- **Exterior**
  - At a minimum, an APR with organic vapor/ particulate (P100) cartridges for sprayer and helper.
  - Unprotected workers should be upwind and at least 30 feet away
PPE for Spray Foaming

OSHA Respiratory Protection Standard*

Many requirements, including, but not limited to....

- Written Respiratory Protection Program
- Medical evaluation prior to first use
- Annual respirator fit test
- Limitations on facial hair (cannot interfere with facepiece seal or respirator valve function)
- Training for employees

*29 CFR 1910.134
PPE for Spray Foaming

Eye Protection

- **Interior**
  - Sprayer/applicator – Protection provided by hood-type or full face respirator – coverage from the forehead to the chin and temple to temple.
  - Helper – Hood-type or full face respirator; or chemical safety goggles (some cases)

- **Exterior**
  - Sprayer/applicator and helper – Hood-type or full face respirator; or chemical safety goggles.
PPE for Spray Foaming

Hand Protection

- **SPF Application**
  - Sprayer - examples include nitrile gloves covered with cotton gloves; or nitrile-coated fabric gloves
  - Helper – same as sprayer; or nitrile, neoprene, butyl, or PVC gloves

- **Liquid Chemical Handling**
  - nitrile, neoprene, butyl, or PVC gloves
PPE for Spray Foaming

Protective Clothing – Sprayer and his helper

- Disposable full body suit with attached hood to protect the skin from exposure.
- Where suit does not have attached hood, protective socks worn over the head to cover the neck are useful to avoid skin exposure.
PPE for Spray Foaming

Foot Protection —

- Safety shoes or boots covered with tape to avoid skin contact with foam.
- Booties may be worn when they do not present a slip hazard.

Other PPE which may be worn —

- Hard hats
- Fall protection
- Hearing Protection
Exterior PPE Poster (available at www.spraypolyurethane.com)

- PPE is Critical for SPF Application
- Respiratory Protection
- Eye Protection
- Skin Protection
  - Eyes
  - Hands (gloves)
  - Shoes / Booties
- MSDS

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 many cases, skin exposure to spray or mist may result in severe health concerns.
- Respiratory Protection: Exterior applications by definition are conducted in open air and typically have no active ventilation or spray foam concentration. For exterior applications, sprayguns must be a NIOSH-approved Air Purifying Respirator or APR with an organic vapor respirator (OV-AR) cartridge. A NIOSH-approved supplied air respirator or SAI, if chosen, may provide greater protection for spray operators. Overalls should be modified to avoid problems with equipment, materials or unexpected person displacement of the spray area. All spray areas should be posted with warning signs/labels.

Employees should use personal protective equipment that is required by the manufacturer and store in a dry, safe, and accessible location (such as in a sealed bag or container) — especially for organic vapor cartridges, out of reach from direct sunlight.

- Warn job supervisors about:
  - damaged or imperfect respirators
  - workplace hazards,
  - questions about the Respiratory Protection Program

Work Boots: Steel-toed work boots are desirable in moist work areas. Protection from overspray can be provided by disposable coveralls or coverall suits. 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 (MSDS) before you start any spray foam application.
Interior PPE Poster (available at www.spraypolyurethane.com)

- Simple, easy to read and reference.
- Highlights need for Supplied Air in an indoor application.
Good Work Practices

**General**

- Essentials — PPE, fire extinguisher, first aid kit, eyewash, spill response materials, MSDS
- Pre-job discussion with building owner/occupant
- Request that the building be unoccupied during and for a period of time following application, if possible
General (continued)

- Overspray protection – plastic sheeting, windscreens, etc.
- Follow manufacturer’s instructions on lift thickness and time between lifts
- Practice good housekeeping
Good Work Practices

**Interior**

- Where not possible or practical to vacate building
  - Establish perimeter around work zone
  - Consider containment with active ventilation (i.e., fan)
    - Restrict access near discharge point(s) / do not locate near air intakes
- Ventilation for attic / crawl space applications
Good Work Practices

**Interior (continued)**

- Shut down HVAC system, and cover supply/return air grilles (where applicable)
- Prohibit access to and ventilate the spray area for a period of time following application (consult SPF manufacturer)
- Post signs warning of fire danger of exposed SPF
Good Work Practices

Exterior

- Shut down HVAC system / seal outdoor air intakes
- Fall protection
Thank you

Posters and guidance documents available at

www.spraypolyurethane.com