Health & Safety Considerations with Spray Polyurethane Foam (SPF) Application

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SPFA 2011 Presentation
February 9, 2011
Federal SPF Workgroup

- EPA
- NIOSH
- OSHA
- CPSC

Industry Workgroup

- ACC Center for the Polyurethanes Industry (CPI)
- Spray Polyurethane Foam Alliance (SPFA)
Goals – presented at SPFA 2010

- Clearly communicate hazards, as well as benefits of SPF.
- Ensure worker training on hazards.
- Ensure premises are restricted to workers wearing appropriate personal protective equipment (PPE).
- Provide guidance on re-entry times based on accurate monitoring data of total reactive isocyanate groups (TRIG) and other chemicals.
- Ensure homeowners, teachers and students, and the general public are not exposed to hazardous chemicals during and after SPF applications.
Update - Progress/Challenges

- Hazard Communication
- Training
- Isolating the Work Site
- Establishing Safe Re-entry Times
- Other Areas of Consideration
- Research Proposals/Projects
- Considerations for Safer Use/Best Practices
- Energy Star Program Update
Hazard Communication - SPF Chemicals of Concern

- Health effects of Isocyanates (A-side) are well documented:
  - leading attributable cause of work-related asthma
  - potent lung and skin sensitizers (allergens) and irritants
  - can trigger severe or fatal asthma attacks in sensitized persons at low levels

- Polyol Blend (B-Side) components are proprietary & variable:
  - usually contain flame retardants, amines or metal catalysts, blowing agents, surfactants
  - may cause adverse health effects, e.g., irritation, sensitization, blurry vision (“halo effect”) & variable GWP

- Other chemicals may form during SPF application.
Hazard Communication – Industry Resources

- SPFA and CPI have actively engaged in product stewardship initiatives to enhance hazard communication and training.

- CPI and SPFA have launched a health and safety website.
  - [http://www.spraypolyurethane.com](http://www.spraypolyurethane.com)
  - [http://www.sprayfoam.org](http://www.sprayfoam.org)

- *Spray Foam* magazine features more information on health & safety issues and use of appropriate PPE by applicators.
  - [http://www.sprayfoam-mag.com](http://www.sprayfoam-mag.com)

- However, clear hazard information on isocyanates (A-side) and the polyol blend (B-side), safe handling guidance, and easy access to this information vary across the industry – and presents an area for continued improvement.
Hazard Communication - Other Resources

- EPA Website and Postcard

- NIOSH Alert on Spray-on Truck Bed Lining Operations has health and safety information relevant to SPF applicators

- OSHA’s Green Job Hazards: Weather Insulating/Sealing
  - [https://www.osha.gov/dep/greenjobs/weather_spf.html](https://www.osha.gov/dep/greenjobs/weather_spf.html)

- Weatherization Assistance Program Technical Assistance
  - [http://ww.waptac.org/Other-Health-and-Safety-Concerns/Spray-Polyurethane-Foam.aspx](http://ww.waptac.org/Other-Health-and-Safety-Concerns/Spray-Polyurethane-Foam.aspx)
Read this Important Safety Information if You Are Considering
Weatherizing with Spray Polyurethane Foam

Spray polyurethane foam (SPF) is a widely used and highly-effective insulator and sealant.

However, exposures to its key ingredient, isocyanates, and other SPF chemicals in vapors, aerosols, and dust during and after installation can cause:

- Asthma, a potentially life-threatening disease
- Sensitization, which can lead to asthma attacks if exposed again
- Other respiratory and breathing problems
- Skin and eye irritation

Read Safety Tips on the Back!

For more detailed health and safety information, visit EPA’s Design for the Environment website at www.epa.gov/dfe and click on “Spray Polyurethane Foam” or go directly to www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html

Safety Tips for Weatherizing with Spray Polyurethane Foam

- Review label and product information for ingredients, hazards, directions, safe work practices, and precautions
- Ensure health and safety training is completed and safe work practices are followed to prevent eye, skin, and inhalation exposures during and after SPF installation
- Exercise caution when determining a safe re-entry time for unprotected occupants and workers based on the manufacturer recommendation

If you experience breathing problems or other adverse health effects from weatherizing with SPF, seek immediate medical attention.

For more detailed health and safety information, visit EPA’s Design for the Environment website at www.epa.gov/dfe and click on “Spray Polyurethane Foam” or go directly to www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html

Front

http://www.epa.gov/dfe/pubs/spf_postcard.pdf

Back
NIOSH Alert and Poster

Publication # 2006-149

Got Everything Covered? #2008-109

NIOSH Poster - Tips for Applicators

- To protect my lungs, wear a full-face supplied-air respirator
- To keep mask clean, use a peel-off shield
- To protect my skin, wear a full-bodied suit and chemical-resistant gloves
- To keep the ventilation system operating at its best, make sure the filters are clean
- If I experience symptoms, such as shortness of breath or skin irritation, tell my supervisor and my doctor
Training

- SPFA offers classroom training and accreditation for applicators.
- CPI updated and posted its Health & Safety Product Stewardship Workbook (March 2010)
- CPI with SPFA has launched a free on-line training program for applicators and helpers.
- Challenge is to ensure that all applicators and helpers receive comprehensive health and safety, plus “hands-on” training.
Isolating the Work Site

- Many contractors communicate upfront with clients and other trades to limit access.
- CPI’s Health & Safety Product Stewardship Workbook contains guidance for discussions on this topic with building owners and occupants.
- The December *Spray Foam* magazine has guidance by experts on containment and ventilation controls.
- Innovative solutions to prevent chemical migration should continue to be developed and shared to ensure industry-wide practice.
Establishing Re-Entry Times

- Manufacturers estimate 23-72 hours after application for two-component high pressure SPF system to fully cure.
- One company has shared emission data on its SPF product/application.
- Emissions data on other product formulations/applications and a standard emissions testing measurement are needed.
- Other factors to consider include:
  - temperature, humidity
  - applicator technique, experience, equipment
  - accurate mixing/proportioning A- and B-sides
  - ventilation and containment
Other Areas of Consideration

- EPA has received some complaints of off-gas persistence after SPF installation.
- EPA has received data showing formaldehyde and other chemical emissions from SPF insulation samples.

How are problems prevented and/or addressed?
- Source reduction
- Emissions testing
- Ventilation
- Remediation
Other Areas of Consideration

- Waste minimization and disposal planning
- Remediation, renovation, & deconstruction guidance
- Long term stability:
  - Fully cured polyurethane foam is not considered a problem.
  - Thermal degradation with heating, welding, or grinding may generate isocyanates and other hazards.
  - Fires generate hydrogen cyanide, isocyanates, carbon monoxide, and amines.
Research Proposals/Projects

- Validating total reactive isocyanate groups (TRIG) monitoring method (DAN method).
- Developing ASTM Method D2205 for measuring chemical emissions.
- Developing guidance on simple exhaust ventilation design principles.
- Evaluating the impact of incremental changes in ventilation rates on SPF emissions.
- Evaluating dust from trimming operations.
Considerations for Safer Use of SPF

- Hazard communication & Training
- Respiratory Protection & Medical Surveillance
- Work site containment and ventilation
- Best work practices, including health & safety
- Upfront establishment of safe re-entry times
- Adequate air exchanges during/after insulation
- Waste minimization and disposal planning

- Consider participating in the NIOSH “Prevention Through Design” Initiative <www.cdc.gov/niosh/topics/ptd/>
EPA’s Design for the Environment (DfE) Best Practices

- The DfE Program forms partnerships to reduce risk to people and the environment through pollution prevention.

- DfE has worked with the automotive refinishing industry since 1997 to identify and promote safer, cleaner, and more efficient practices and technologies for spray painting and related operations.

http://epa.gov/dfe/best_practices.html
Energy Star Program – Update

EPA is currently revising requirements for insulation manufacturers to participate in Energy Star.

Spray foam manufacturers will need to provide:
  - Clear and specific safe installation practices and personal protective equipment listed on containers.
  - Specific information on chemical reactants.
  - Cure times and safe re-entry times after installation.
  - MSDS for chemical reactants with complete hazard information listed.

All products must be 3rd party certified for R-values and flame/smoke spread.
Industry Websites

SPFA:  http://www.spraypolyurethane.com

CPI:  http://www.sprayfoam.org

Spray Foam magazine:
http://www.sprayfoam-mag.com
Government Websites

NIOSH - Isocyanates:  http://www.cdc.gov/niosh/topics/isocyanates/
NIOSH - Prevention through Design Initiative:  http://www.cdc.gov/niosh/topics/ptd/
OSHA Green Jobs:  https://www.osha.gov/dep/greenjobs/weather_spf.html
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