

MICHIGAN



MICHIGAN STATE UNIVERSITY: Prevention of work-related injuries & illnesses through research & investigation

INVESTIGATION/RESEARCH Prevent Work-Related Asthma from Isocyanate Exposure in SPF- Spray Polyurethane Foam Applications for Insulation in the Construction Industry.

The ability of isocyanates to quickly turn from liquid to an expanded solid form and to provide a competitive insulation factor allows its use in the insulation of homes and other buildings. In the construction industry, a process called “spray polyurethane foam (SPF)” is commonly used to insulate buildings.

A two-component system that contains MDI, a type of isocyanate, is sprayed into attic spaces, wall spaces and anywhere else insulation is needed, potentially exposing workers applying the SPF, co-workers and the residents of the home who are in the area during the application. Exposure occurs from breathing isocyanate fumes or absorbing isocyanate through the skin. Over-spray, incorrect application, spray gun malfunction or entering the area prior to complete curing can all result in increased exposure.

Individuals who develop work-related asthma (WRA) from exposure to isocyanates may continue to have their asthma even after they stop working with SPF. *It is important for workers to cease any exposure to isocyanates once they develop symptoms so as to increase the chance that their WRA will completely cease.*

CASE NARRATIVES

Four workers have been reported in Michigan with occupational asthma from exposure to isocyanates while working in SPF application:

CASE 1: A male in his 40s worked for 3 years as an insulation foam sprayer. His asthma began within one month of starting this job. There was an incident where some of the foam got into his mask when he was trying to empty a canister. He immediately experienced shortness of breath, wheezing and chest tightness. He sought treatment and was prescribed Albuterol, Prednisone and Dulera. He typically wore a spray suit, mask with organic filter, gloves and a head sock. Although he continued to have breathing symptoms, he quit taking his asthma medication due to its cost. A MIOSHA inspection revealed multiple violations including hazard communication and respiratory protection. Air monitoring for MDI was below the ceiling limit.

CASE 2: A male in his 30s worked for 10 years as a home foam insulation installer. When he first began working for the company no personal protection equipment was provided. He developed shortness of breath, chest tightness and a cough immediately after a spill. He had one trip to the Emergency Department. He was diagnosed with asthma and prescribed an inhaler 2 years after his symptoms began. He asked his boss about applying for workers' compensation for his asthma, but his boss told him he would be denied compensation because he smoked cigarettes, so he did not apply. Eventually the company provided gloves, a respirator and a body suit.

CASE 3: A male in his 20s was a spray gun installer at a foam insulation company. He experienced a cough, wheezing, chest tightness and shortness of breath 7 months after starting this job. He had one Emergency Department visit. He was diagnosed with asthma and prescribed Albuterol and Prednisone 9 months later. He wore a full face respirator, a body suit and gloves. He was reassigned to a different job at the same company after his asthma began.

CASE 4: A male in his 30s worked as a spray foam insulation operator. He developed asthma and was prescribed Serevent and Prednisone. He was fired after he developed asthma.

RECOMMENDATIONS TO PREVENT THE DEVELOPMENT OF WRA AMONG FOAM INSULATION WORKERS IN THE CONSTRUCTION INDUSTRY

- **Employers should provide comprehensive training** on the hazards of working with isocyanates, including proper personal protective equipment (PPE) and its maintenance, application and containment strategies, restricted access work areas/zones, local/general exhaust ventilation, clean up and first aid measures. *Sprayers AND helpers should wear the same PPE; if not they should be out of the building.*
- **Proper PPE includes:** NIOSH-approved supplied air respirator (SAR) (recommended) or an air purifying respirator (APR) with combination organic vapor/particulate (P100) cartridges; disposable shoe coverings and coveralls; nitrile, neoprene, butyl, or PVC gloves; and safety glasses or goggles if full face respirator is not worn.
- **Employers should provide medical surveillance for employees** including baseline breathing tests. A recommended protocol can be found at: www.oem.msu.edu
- **Employees should get involved!** Good work practices and adherence to proper procedures for preparation of the work area, making sure equipment is in good repair, spill procedures and clean-up are key elements to staying safe.



www.sprayfoam.org

DID YOU KNOW?

- **Skin contact** with isocyanates can cause sensitization and asthma.
- **Measured exposures** by MIOSHA that show isocyanate levels BELOW permissible limits can lead to sensitization and asthma.
- **The odor threshold**, the level at which an individual can smell an isocyanate, is higher than the permissible exposure limit.

RESOURCES

Guidance on Best Practices for the Installation of Spray Polyurethane Foam: <https://polyurethane.americanchemistry.com/Spray-Foam-Coalition/Guidance-on-Best-Practices-for-the-Installation-of-Spray-Polyurethane-Foam.pdf>

Green Seal GS-54 Standard for Architectural Thermal Insulation Materials:

http://www.greenseal.org/Portals/0/Documents/Standards/GS-54%20Development/GS-54_Ed1-0_%20Insulation_Materials.pdf

Spray Polyurethane Foam Alliance: <http://www.sprayfoam.org/>

MIOSHA Fact Sheet – Isocyanate Exposure in Construction:

http://www.michigan.gov/documents/lara/lara_miosha_constfact_isocyanate_exposure_in_construction_413870_7.pdf

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