

# Isocyanate-based Spray-on Linings: Worker Protection

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## Purpose

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The purpose of the document is to keep owners, operators and workers in the spray-on linings industry informed about important worker safety and health information associated with isocyanates based spray-on lining products.



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### Worker Protection

Isocyanate-based spray-on lining products have protected vehicles (e.g., trucks, trailers, and boats) from wear and tear over many years through the application of polyurethane, polyurea or polyurea hybrid systems. This brochure addresses worker protection considerations during the application of spray-on lining systems, as the spraying of an isocyanate-based system requires specific handling and care.

Whether it is polyurethane or polyurea, virtually all these products use isocyanates-based materials (e.g., MDI, methylene diphenyl diisocyanate and/or HDI, hexamethylene diisocyanate). Isocyanates have been known to cause irritation of the eyes, nose, throat, lungs, and skin. They can also cause allergic reactions (sensitization) of the skin and lungs. When atomized (e.g., sprayed) or heated, there is a greater potential for overexposure. The (Material) Safety Data Sheet (SDS) of the product will provide a list of potential health effects and their symptoms.

Overexposure to isocyanates potentially can cause occupational asthma. Symptoms of asthma include wheezing, shortness of breath, chest tightness, and coughing. If you experience any of the mentioned symptoms and you work with spray-on linings, then continued exposure to isocyanates may be very harmful to your health. For instance, authorities in Michigan investigated the death of a worker in his mid-forties who died from an acute asthmatic attack after applying an MDI-containing spray-on truck bed liner to the interior of a van.<sup>1</sup> If you have health concerns, then stop work immediately and refer to the SDS.

In some circumstances, OSHA regulations require that you see a doctor to determine if your health is at risk (29 CFR 1910.1018 App C). Under these OSHA regulations, your employer must provide or pay for this examination. During the examination, tell your doctor about your symptoms and let him or her know that you work with, or are intending to work with, an isocyanate-containing product. If isocyanate sensitization or occupational asthma is diagnosed, or if your doctor does not clear you to work with isocyanates due to poor respiratory function, then any contact with isocyanates, even very small amounts, could be a serious risk to your health.

Contact with very small amounts of isocyanates can cause an asthmatic reaction in those who are sensitized. If you become sensitized and continue to work with isocyanates, your underlying asthma may worsen and at some point may become life-threatening, even if you use personal protective equipment (i.e., a respirator) or use an inhaler to temporarily relieve asthma symptoms.

Anyone who is not asthmatic or sensitized to isocyanates and is cleared by a physician to work with these materials can help to minimize the potential risks of exposure by keeping in mind safety precautions.

General safety precautions\* include but are not limited to the following:

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<sup>1</sup> Michigan Fatality and Control Evaluation (MIFACE) Investigation #03MI018, December 2003, <http://oem.msu.edu/MiFace/03MI018.pdf>

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1. Carefully read and follow all safety precautions listed on the product label and SDS. The SDS will describe proper first aid procedures in case of accidental exposure.
2. Appropriate ventilation can help minimize risks:
  - a. Ventilated enclosures, when properly maintained and operated at the appropriate air flow rates, could help to control airborne isocyanate concentrations inside the enclosure and could help to prevent the escape of vapors and mists into the surrounding work area (29 CFR 1910.94).
  - b. Use of ventilated enclosures helps contain exhaust spray mists and vapors developed during spraying. Exhaust filters and stacks help to minimize exposure to people outside the building.
  - c. An ongoing ventilation system preventive maintenance program can help you to remember to change filters regularly and maintain airflows.
  - d. Ventilated enclosures, when properly maintained and operated at the appropriate air flow rates, help to control airborne isocyanate concentrations inside the enclosure and help to prevent the escape of vapors and mists into the surrounding work area.
3. OSHA regulations (which can be located on-line at <http://www.osha.gov>) require employers to provide respirators where necessary to protect the health of employees (see 29 CFR 1910.134). Supplied-air respirators can protect employees from exposure to isocyanates during spray application and may in fact be necessary to meet OSHA or other governmental workplace requirements. Testing the air during application will aid in the determination of the appropriate level of respiratory protection.
4. To prevent contact of the product with your skin or eyes, you should wear gloves, eye protection, and other protective clothing when appropriate or required to comply with OSHA regulations (29 CFR 1910.132).
5. Testing the air after application could help to determine when you can enter the enclosure without being exposed to potentially harmful levels of isocyanates.
6. Where applicable, comply with training as well as other OSHA Hazard Communication Standard (29 CFR 1910.1200) requirements.
7. Setting up a spill clean-up plan before starting work can help you to quickly and appropriately clean up the product if a spill or leak occurs. Protecting people first, then minimizing environmental releases and protecting property and product, will help to prevent people from potentially being exposed to isocyanates. Review the manufacturer SDS for more information.
8. Inhaling smoke or vapors from welding, torch-cutting or any other hot process that blisters, chars or burns the spray-on lining, whether freshly applied or fully cured, may be dangerous to your health.

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9. Remember that resealing the isocyanate container when it has become contaminated with moisture could cause the container to swell and potentially rupture with excessive force.
10. Be aware that there may be other federal, state and local regulations that apply to the operations at your worksite, beyond those mentioned in this document.

\* These precautions are not all-inclusive, and do not identify all the safety measures or legal requirements that may apply at your particular worksite. Consult the supplier's SDS, the websites provided in this pamphlet, and the laws that apply to your worksite for additional information.

### Additional Information

For further information on worker safety and health in the spray-on linings industry visit <http://polyurethane.americanchemistry.com/>.

### Legal Notice

This brochure was prepared by the American Chemistry Council's Center for the Polyurethanes Industry. It is intended to provide general information to professional persons who may handle isocyanates-based spray-on linings. It is not intended to serve as a substitute for in-depth training or specific handling or storage requirements, nor is it designed or intended to define or create legal rights or obligations. All persons involved in handling isocyanates-based spray-on linings 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 legal counsel concerning such matters. The guidance is necessarily general in nature and individual companies may vary their approach with respect to particular practices based on specific factual circumstance, the practicality and effectiveness of particular actions and economic and technological feasibility. Neither the American Chemistry Council, nor the individual member companies of the Center for the Polyurethanes Industry of the American Chemistry Council, nor any of their respective directors, officers, employees, subcontractors, consultants, or other assigns, makes any warranty or representation, either express or implied, with respect to the accuracy or completeness of the information contained in this brochure; nor do the American Chemistry Council or any member companies assume any liability or responsibility for any use or misuse, or the results of such use or misuse, of any information, procedure, conclusion, opinion, product, or process disclosed in this brochure. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

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