

Guidance Document on Spray-on Polyurethane/Polyurea-Based Lining Applications Containing Isocyanates

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Purpose

The Center for the Polyurethanes Industry (CPI) prepared this guidance document to provide information to professionals concerning important health and safety aspects when working with isocyanates during spray-on lining applications. Although isocyanates based on MDI (diphenyl methane diisocyanate) and HDI (hexamethylene diisocyanate) commonly are used in truck bed and other types of lining systems, it is not the only material in the system that may be potentially harmful to your health; therefore, it is important to read all the information contained in your supplier's Safety Data Sheets or SDSs (formally known as Material Safety Data Sheets or MSDSs) for the particular spray-on lining system that you are using. SDSs are the primary sources of extensive and specific information on isocyanates as well as on other spray-on lining system ingredients.

This guidance document is intended to help spray-on lining companies, such as truck bed liner companies, educate its workers about isocyanates and appropriate worker protection related to isocyanates. For supporting information, a complimentary video is available on CPI's website (<http://polyurethane.americanchemistry.com/Spray-Truck-Bed-Liner/Truck-Bed-Liner-Video.html>) for additional information about working safely with isocyanates-based spray-on linings. Neither CPI nor its member companies are responsible for worker protection, or worker protection programs, for spray-on lining companies.



Center for the
Polyurethanes Industry

Introduction

Isocyanate-based spray-on linings, such as truck bed 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 document addresses important points to be considered during the application of spray-on lining systems.

What is an Isocyanate?

Isocyanates are a family of chemical intermediates used to make polyurethane/polyurea products, and have been in use since the late 1940s. Isocyanates are one of the components used in polyurethane and polyurea coatings, which are used in spray-on lining systems. In two-component spray on lining systems, professionals generally refer to the isocyanates as the “A-side” or the “iso-side” and the resin/polyol blend as the “B-side” of the system.

Recognizing Potential Health Hazards

Overexposure to isocyanates can have potential health effects. When isocyanates are sprayed, there is the potential for overexposure by:

- Breathing airborne concentrations
- Getting it on your skin
- Getting it in your eyes
- Swallowing it

In addition to what is identified in the product SDS, here are some examples of the effects of possible overexposure and some recommended first-aid procedures:

Inhalation: If isocyanates are sprayed or heated, there is an increased chance of overexposure through inhalation. Isocyanates can irritate your nose and lungs. With overexposure, you may feel tightness in your chest and have difficulty breathing. If you continue to be overexposed, you may become sensitized (i.e., allergic) to isocyanates. Once sensitized, the effects may start as soon as you begin to work with the product, or later on in the day after you’ve stopped working with the product (e.g., when you’ve left work). If you are sensitized, then you may experience health effects even when airborne isocyanate levels are very low and may be at risk for experiencing an asthma attack. If you are sensitized, **DO NOT CONTINUE TO WORK WITH ISOCYANATES**; asthma attacks can be life-threatening. If you start to feel any of the symptoms listed above, let your supervisor know immediately and seek medical attention. If you suspect someone has become overexposed, remove the person to an area with fresh air, and try to keep them calm and warm, but not hot. If they are having difficulty breathing, a qualified person may provide oxygen. If they stop breathing, then have trained first aid personnel perform artificial resuscitation. Seek emergency medical attention.

Skin Contact: Getting isocyanates on your skin may result in an irritation effect and/or allergic sensitization. In addition, animal tests have indicated that skin contact, followed by inhalation exposure, may result in lung sensitization. If lung sensitization or skin irritation occurs, seek immediate medical attention. Repeatedly getting isocyanate on your skin may

cause discoloration, redness, and swelling or blistering; this also could lead to skin sensitization. Avoid unprotected skin contact, but if you get isocyanate on your skin, wash it thoroughly with soap and flowing water as soon as possible after exposure. Refer to the manufacture's SDS for information.

Eye Contact: Getting isocyanate in your eyes can be painful and could cause tearing and irritation. If you get isocyanate in your eyes, wash them immediately with a continuous flow of lukewarm, low pressure water, preferably from a well-maintained eyewash fountain, for at least 15 minutes. Seek immediate medical attention.

Ingestion: Irritation can result from swallowing isocyanates. If you accidentally swallow isocyanates, do not induce vomiting. Wash out the mouth with water and then seek rest and immediate medical attention.

Additional information about potential health hazards is available through the product's SDS and on the CPI website at www.polyurethane.org.

Ways to Avoid Isocyanate Overexposure

With proper precautions and the use of personal protective equipment (PPE), you can avoid overexposure to isocyanates during the application of your spray-on lining system.

For tasks that do not involve spraying (such as cleaning equipment), but where you may have direct contact with isocyanate liquid (at room temperature), use PPE including:

- Safety glasses with eye shields or chemical goggles,
- Isocyanate-resistant chemical gloves (e.g., nitrile),
- Isocyanate-resistant clothing (e.g., apron or coveralls), and
- Safety shoes or boots.

When applying a spray-on lining system, use PPE, including the following:

- An approved supplied air respirator (as outlined in your company's Respiratory Protection Program)*,
- Chemical goggles,
- Isocyanate-resistant chemical gloves (e.g., nitrile),
- Isocyanate-resistant long-sleeve coveralls or full body suit with hood, and
- Isocyanate-resistant fitted boots/booties.

*The level of respiratory protection provided by the supplied air system is dependent upon the facepiece that is chosen; therefore, consult your company's respiratory protection program and the manufacture's SDS for guidance.

For other tasks where there is the potential for exposure to isocyanate vapor/mist, follow the guidelines suggested for activities involving spraying. Workers not wearing the correct PPE must not enter the spray enclosure until the airborne levels are below the allowable limits. Additional information is available through the product's SDS and on the CPI website at www.polyurethane.org.

Wearing a Respirator

According to the Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard, employees are required to have a medical evaluation and receive medical approval before using a respirator. After approval is given, a respirator fit test is required by OSHA. The fit test is conducted using the respirator you will be wearing on the job. Each time you use a tight-fitting facepiece, conduct a 'user seal check'. However, OSHA states that tight-fitting facepiece respirators are not permitted for use if:

- You have facial hair that interferes with either the sealing surface of the respirator and the face, or interferes with the valve function;
- You wear corrective glasses/goggles or if other personal protective equipment interferes with the seal of the facepiece; or,
- Any other condition interferes with the facepiece seal.

Regularly clean and disinfected your respirator according to the instructions provided by the respirator manufacturer. Deteriorated parts are replaced prior to equipment use. Inspect your respirator regularly for:

- Cracks, tears, holes, facemask distortion, cracked or loose lenses/face shield;
- Breaks, tears, broken buckles/clasps, overstretched elastic bands in head strap;
- Residue/dirt, cracks or tears in valve and absence of valve flap; and,
- Breathing air quality/grade, condition of supply hoses, hose connections; settings on regulators and valves.

Defective respirators or those with defective parts are to be taken out of service immediately. Notify your supervisor about all respirator defects. Additional information about respirators is available through the product's SDS, in your company's Respiratory Protection Program, and on the CPI website at www.polyurethane.org.

Contain the Overspray of Isocyanates

Appropriate ventilation, combined with a properly designed spray enclosure, can help minimize exposure to isocyanates. The use of a ventilated spray enclosure helps to contain spray mists and vapors that are generated during the application. Further, exhaust ventilation systems with efficient filters help to capture the spray mist, which can reduce the potential exposure to people outside the building. While there is no standard as to which spray-on lining enclosure design is most effective at controlling isocyanate vapors or mists, here are some considerations: 1) maintain a negative pressure with respect to the outside environment (i.e., the air should be pulled into the enclosure not pushed out of the enclosure); 2) size the enclosure to allow the item (e.g., truck bed) to fit, while giving the applicator space to move safely within the enclosure; and 3) as previously mentioned, wear the appropriate level of personal protective equipment (PPE). A preventive maintenance program for the ventilation system will help you to know when to change filters, check the airflow, etc. A spray-on lining is applied when the ventilation system is operating properly and the right level of PPE is being used. Workers needing to enter the enclosure while an applicator is applying a lining, or

shortly after the application has stopped, wear the appropriate level of PPE, as described by OSHA (29 CFR 1910.132).

Completing the Job

Remove PPE only after exiting the spray enclosure and completion of cleanup. PPE is also worn while cleaning isocyanate-contaminated equipment and while handling any isocyanate containers (i.e., drums, buckets, etc.). The type of PPE needed should follow the OSHA Requirements (29 CFR 1910.132). It is a good work practice to keep all work clothing at work. Any clothing contaminated with an isocyanate is promptly removed and properly disposed of or cleaned. Leather items cannot be decontaminated. Any contaminated leather items including shoes, belts, and watch bands or clothing, are properly discarded. Isocyanates are reactive chemicals; therefore, seal containers of isocyanates to reduce contamination. However, resealing containers contaminated with water, polyol, or amine (i.e., “B-side” chemical) can cause a buildup of pressure in the container due to the generation of carbon dioxide. A pressurized container may rupture. Isocyanates can self-react in a fire or at very high temperatures and release carbon dioxide. Carbon dioxide can build pressure in sealed containers sufficient to cause rupturing of the container. Additional information is available through the product’s SDS and on the CPI website at www.polyurethane.org.

Responding to Emergencies

Fires, spills, and other emergencies involving isocyanates require an immediate response by trained and knowledgeable personnel. If you have not been trained to respond to an emergency, leave the area immediately and notify the appropriate emergency response personnel. **If you need additional guidance, call CHEMTREC® at 1-800-424-9300.** CHEMTREC® operators are available 24 hours a day, seven days a week. CHEMTREC® is a communication center dedicated to assisting emergency responders handling incidents involving hazardous materials. Additional information is available on CPI’s website at www.polyurethane.org.

Legal

This guidance document 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 spray-on polyurethane/polyurea-based lining applications using isocyanates. It is not intended to serve as a substitute for in-depth training or specific handling, nor is it designed or intended to define or create legal rights or obligations. It is not intended to be a “how-to” manual, nor is it a prescriptive guide. All persons involved in handling spray-on polyurethane/polyurea-based lining applications using isocyanates 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

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