

# Health and Safety Guidance for Installation of Outdoor Polyurethane Running Track Surfaces

ISSUE AX502 • November, 2013

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## Purpose

This guidance document is intended to provide safe handling information to professional contractors installing outdoor running track surfaces utilizing polyurethane materials. The primary purpose is to provide information to users and outline best practices for appropriate protective measures for handling polyurethane (PU) or diisocyanate-containing products. This document is designed to supplement health and safety information currently available from the material suppliers (i.e., Safety Data Sheets (SDSs) and Product Data Sheets). For specific information, consult the manufacturer's SDS.

### PU Products Used During an Outdoor Track Installation

Outdoor PU running track surfaces consist of several different polyurethane systems. The most common outdoor PU surface consists of a base mat made of rubber granules or rubber crumbs bound together with a PU binder. In addition to the PU binder, other PU products that may be used include a primer, pore filler/sealant, a structural spray coating, two-component wear coats, and other protective coatings. These PU products are formulated from diisocyanates including MDI (methylene diphenyl diisocyanate) and TDI (toluene diisocyanate). The composition of TDI monomer is typically less than 0.5% when present in the PU product. The composition of MDI monomer is typically less than 25% in the PU products.

The PU products used during outdoor installation are primarily single component moisture curing materials. They are used to bind SBR (styrene butadiene rubber) or EPDM (ethylene propylene diene monomer rubber). PU running track surfaces are used because they have excellent adhesion properties, hydrolytic stability, and resiliency.

### Health and Safety Information

Although other chemicals such as polyether polyols and organic solvents may be components of some PU products used during a track installation, this guidance will address the health and safety information for TDI and MDI only. During the handling, processing, and application of PU materials used throughout installation of a polyurethane running track surface, it is important to avoid direct skin or eye contact and inhalation (breathing) of TDI or MDI vapors/spray mist. Direct skin or eye contact with liquids containing TDI or MDI, or inhalation of TDI or MDI vapors or spray mist above occupational exposure limits, may cause adverse health effects.

Inhalation overexposure to MDI and TDI may cause 1) irritation of the nose, throat, and lungs, causing runny nose, sore throat, coughing, tightness in the chest, and shortness of breath, and 2) in some cases respiratory tract sensitization (i.e., the development of occupational asthma). Once an individual is sensitized, subsequent exposures may cause symptoms of chest tightness, shortness of breath, coughing, and/or wheezing. Note that severe asthma attacks can be life threatening. NIOSH notes that “early recognition of sensitization and prompt and strict elimination of exposures is essential to reduce the risk of long-term or permanent respiratory problems for workers who have become sensitized.”

Skin contact with diisocyanates may cause irritation, and in some cases, skin sensitization (allergy). Symptoms may include reddening, itching, swelling, and rash. Skin contact may also lead to respiratory sensitization based on animal data<sup>1</sup>. Direct eye contact causes irritation with symptoms of reddening, tearing, stinging, and swelling.

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<sup>1</sup> Herrick, C.A., L.X. Xu, A.V. Wisniewski, J. Das, C.A. Redlich, and K. Bottomly: A novel mouse model of diisocyanate-induced asthma showing allergic-type inflammation in the lung after inhaled antigen challenge. *J. Allergy Clin. Immunol.* 109(5): 873-878 (2002)

### Work Practice Control Measures

Because of the potential health and safety concerns discussed above, it is important to reduce the potential exposure of workers. At most work sites, a combination of work practice control measures are used, including engineering controls, administrative controls, and PPE.

Appendix A of this document includes a Health and Safety Checklist for outdoor jobsites where polyurethane products containing MDI or TDI are used to install a running track surface.

#### Engineering Controls to Minimize Exposure:

- All equipment is in good condition and hoses, fittings, and connections are not at risk of failure that can cause product to splash, spray or spill unintentionally.
- A portable eyewash station is available at the work site per ANSI Standard (Z358.1-1990, revised 2009).
- Recognize issues that could impact unintended exposures to employees and others, (like, wind or high temperatures).

#### Administrative Controls:

Before using materials containing MDI or TDI, read and understand the entire SDS for the product. OSHA requires that SDSs be readily available for all products used at the jobsite. One example of an administrative control is rotating employees through different tasks to minimize the length of time that exposure to TDI or MDI could occur. There may be other administrative controls that apply to your worksite that are work practice control measures.

#### Personal Protective Equipment:

Proper precautions and the use of personal protective equipment (PPE), can be used to help prevent employees overexposure to TDI or MDI during a PU running track installation.

For tasks involving use of a PU product (i.e., use of a roller, brush, squeegee; mixing, paving or spray applications), where the employees may have direct contact with a product that contains TDI or MDI, follow the manufacturer's SDS for the proper PPE recommendations. In general, PPE may include but is not limited to:

- Safety glasses or goggles;
- Chemical resistant gloves;
- Coveralls (e.g., disposable);
- When there is the potential for a liquid PU product to splash impermeable clothing (e.g., PVC, polyethylene); and
- Safety shoes or work boots.

Based on the specific task, there may be other PPE that is used by an employee.

During any spray application involving a PU coating and paving operations using a PU binder, wear respiratory protection equipment. Appropriate respiratory protection may include an air-purifying respirator (APR) or a supplied-air respirator (SAR). With regard to use of respiratory protection, the following items are important considerations:

- A Company-Specific Respiratory Protection Program is necessary whenever respirators are required by the employer in accordance with the OSHA Respirator Standard (29 CFR 1910.134 (c)).
- Employees assigned to wear a respirator are required by OSHA to be included in the employer's Respiratory Protection Program (29 CFR 1910.134).
- All respiratory protection equipment meets NIOSH certification and is set-up and used following NIOSH's recommended guidelines.
- If air-purifying respirators are used, the equipment has organic vapor cartridges and particulate pre-filters.
- If supplied-air respirator systems are required, it is to supply Grade D breathing air (29 CFR 1910.134(i)(1)(ii)).
- For spray applications, use of disposable coveralls with a hood helps to minimize skin contact from overspray particles/mist.

Where heat stress may be a concern, consider the use of lightweight disposable coveralls. In addition, consider fabric gloves coated with nitrile, neoprene, butyl or PVC, or cotton/leather work gloves worn over disposable nitrile gloves that may provide more durability and wear resistance during some work tasks.

While the recommended PPE for TDI and MDI containing products may also provide protection for incidental contact with organic solvents (i.e., petroleum naphtha, mineral spirits, xylene, ethyl benzene, butyl acetate) when handling cleaning or thinning agents, review the SDS for those products for specific information about the proper PPE. Continue to wear PPE while cleaning equipment and while handling any containers with TDI or MDI (i.e., totes, drums, 5-gallon buckets).

### General First-aid Measures

First-aid measures can be found on the SDS. Below are some typical first-aid measures related to MDI and TDI, always refer to the SDS for more specific information:

#### *Inhalation (breathing high airborne concentrations of TDI or MDI)*

- Move the individual to fresh air, away from the application area.
- Administer CPR and/or oxygen if needed.
- Seek immediate medical attention.

#### *Eyes*

- Flush with lukewarm water for at least 15 minutes.
- Seek immediate medical attention.

#### *Skin*

- Remove contaminated clothing.
- Wash thoroughly with soap and water.
- Seek immediate medical attention.

#### *Ingestion*

- Do not induce vomiting.
- If conscious, rinse mouth with water.
- Seek immediate medical attention.

### General Good Work Practices

- Wear appropriate PPE to avoid overexposure to TDI and MDI during installation. It is important to avoid direct skin and eye contact with TDI and MDI.
- Have the most current SDS for each PU product on the jobsite and readily available per OSHA (29 CFR 1910.1200 (g)(1)).
- Ensure all workers are aware of the potential chemical hazards and the work practices/protective measures that need to be followed to prevent overexposure (29 CFR 1910.1200).
- Restrict access to the work area.
- Post signs or warning tape alerting individuals not wearing PPE to refrain from entering the work site area.
- Establish measures to control overspray particles during spray applications of PU products (i.e., spray mist).
- Provide a first aid kit, emergency eyewash station, and appropriate fire extinguisher at each job site.
- Keep PU product containers closed when not in use. For long-term storage, store materials in a dry location protected from the sun and rain (e.g., use tarps to cover or keep in storage trailer).
- Use good housekeeping measures and clean-up procedures prior to leaving the work site.
- Provide spill control kits at each work site, training on proper spill clean-up procedures, and know who to call in case of a large spill.
- Be aware of all applicable federal, state, and local waste disposal regulations, and dispose of waste accordingly.

### Additional Information

- ACC Center for the Polyurethanes Industry (CPI) websites: [www.polyurethane.org](http://www.polyurethane.org)
- ACC Diisocyanates Panel (DII): <http://dii.americanchemistry.com>
- America Sports Builders Association (ASBA): <http://sportsbuilders.org>
- "Safe Handling of Diphenylmethane Diisocyanate (MDI)" - 2007. U.S. National Institute of Occupational Safety and Health (NIOSH) - [www.cdc.gov/niosh/topics/isocyanates](http://www.cdc.gov/niosh/topics/isocyanates) - Safety and Health Topic: Isocyanates
- Safety Data Sheets and other health and safety literature can be obtained by contacting your supplier.
- Center for the Polyurethanes Industry, 2013. Guidelines for the Selection of Protective Clothing for MDI Users (AX-178).
- Center for the Polyurethanes Industry, 2013. Guidance for the Selection of Protective Clothing for TDI Users (AX-179).
- Center for the Polyurethanes Industry, 2013. Guidance for Developing a Written Respiratory Protection Program (AX-501).
- Center for the Polyurethanes Industry, 2012. Guidance for Working with MDI and Polymeric MDI: Things You Should Know (AX-205).
- Center for the Polyurethanes Industry, 2012. Guidance for Working with TDI: Things You Should Know (AX-202).

### Appendix A: Health and Safety Checklist for Jobsites where MDI and TDI are used in Outdoor PU Running Tracks

<b>Engineering Controls to Minimize Exposure:</b>	
	All equipment is in good condition and hoses, fittings, and connections are not at risk of failure that can cause product to splash, spray or spill unintentionally
	A portable eyewash station is available at the work site per ANSI Standard (Z358.1-1990, revised 2009).
	Recognize issues that could impact unintended exposures to employees and others, (like, wind or high temperatures).
<b>Administrative Controls:</b>	
	One example of an administrative control is rotating employees through different tasks to minimize the length of time that exposure to TDI or MDI could occur. There may be other administrative controls that apply to your worksite that are work practice control measures.
	Read and understand the entire Safety Data Sheet (SDS) for products being used. OSHA requires that SDSs be readily available to workers for all products used at the jobsite.
<b>Based on the specific task, Personal Protective Equipment (PPE) including but not limited to the following may be used by a worker:</b>	
	Safety glasses or goggles
	Chemical resistant gloves
	Coveralls (e.g., disposable)
	When there is the potential for a liquid PU product to splash impermeable clothing (e.g., PVC, polyethylene); and
	Safety shoes or work boots
<b>Based on specific task, there may be other PPE that is used by an employee. When paving or spraying a PU based product consider the following:</b>	
	A Company-Specific Respiratory Protection Program is necessary whenever respirators are required by the employer in accordance with the OSHA Respirator Standard (29 CFR 1910.134 (c).
	Employer's Respiratory Protection Program (29 CFR 1910.134). All respiratory protection equipment meets NIOSH certification
	All respiratory protection equipment meets NIOSH certification and is set-up and used following NIOSH's recommended guidelines.
	If air-purifying respirators are used, the equipment has organic vapor cartridges and particulate pre-filters.
	If supplied-air respirator systems are required, it is to supply Grade D breathing air (29 CFR 1910.134(i)(1)(ii)).
	For spray applications, use of disposable coveralls with a hood helps to minimize skin contact from overspray particles/mist.

### Legal Notice

This guidance document was prepared by the American Chemistry Council's Center for the Polyurethanes Industry. It is intended to provide general information to running track applicators, who may work with materials used in installation of polyurethane running track surfaces. 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. It is not intended to be a "how-to" manual, nor is it a prescriptive guide. All persons involved in handling materials used in installation of polyurethane running track surfaces 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 guidance document; 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 guidance document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

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