

Ergon Armor      **Revision Number:** 5.000  
**Issue Date:** 01/18/12

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** URETHANE ASPHALT HARDENER - ID(s):  
**PART B**  
**Product type:** Aromatic Isocyanate      **MSDS Format:** United States

**Company address:** Ergon Armor  
Corrosion Engineering  
300 Stevens Drive, Suite 310  
Lester, PA 19113

**Contact information:**  
Telephone: 601.933.3540  
Emergency: Call CHEMTREC at 800.424.9300  
Internet: www.Ergon.com

**2. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

**Physical state:** Liquid  
**Color:** Dark brown, black  
**Odor:** Musty

**HMIS:**  
HEALTH: 2\*  
FLAMMABILITY: 1  
PHYSICAL HAZARD: 1  
Personal Protection: See MSDS section 8  
0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe  
\* = Chronic Health Hazard

WARNING! CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION. MAY CAUSE SENSITIZATION BY INHALATION AND SKIN CONTACT.

**Relevant routes of exposure:** Inhalation and skin contact

**Potential Health Effects**

**Inhalation:** Single inhalation exposure to high concentrations may be irritating to eyes and respiratory tract with symptoms such as a burning sensation in the nose and mouth, runny nose, sore throat, coughing and chest discomfort. Repeated exposure has resulted in an allergic respiratory reaction (respiratory sensitization) with asthmatic - or pneumonia-like symptoms. Individuals with respiratory sensitization may experience delayed symptoms of chest tightness, wheezing, cough, shortness of breath or fever. Long-term exposure in the workplace has been reported to cause decreased lung function and long-term inhalation studies in rats have resulted in increased lung tumors at levels that caused fibrotic changes. Limited human epidemiological studies have not shown any significant increase in cancer associated with exposure to isocyanates. Inhalation exposure to this material may aggravate pre-existing lung disorders. This material is considered, on the basis of single exposure (acute) animal tests to be moderately toxic after inhalation.

**Skin contact:** This material may be absorbed through the skin, resulting in an allergic skin reaction and contributing to respiratory sensitization. Contact of liquid with skin may be irritating with symptoms such as redness, swelling, rash, scaling or blistering. This material is considered, on the basis of single exposure (acute) animal tests, to be practically non-toxic after skin contact.

**Eye contact:** Direct contact of liquid with eyes can be severely irritating with symptoms such as tearing, redness, swelling and eye damage.

**Ingestion:** While swallowing this material is unlikely in the industrial setting, if swallowed, this material may be irritating to the mouth, throat, stomach and digestive tract. Symptoms of injury may include sore throat, abdominal pain, nausea, vomiting and diarrhea. This material is considered, on the basis of single exposure (acute) animal tests, to be practically non-toxic after ingestion (swallowing).

**Existing conditions aggravated by exposure:** Pre-existing lung disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).  
**See Section 11 for additional toxicological information.**

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS-No.	%
Polymeric Diphenylmethane Diisocyanate (pMDI)	9016-87-9	50-60
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	35-45
2,4'-Diphenylmethane Diisocyanate (MDI)	5873-54-1	3-7

### 4. FIRST AID MEASURES

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Skin contact:** Immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Destroy contaminated shoes.

**Eye contact:** Immediately flush with plenty of water for at least 15 minutes. Get medical attention.

**Ingestion:** Do NOT induce vomiting. Give water to drink. Get medical attention. Call a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

### 5. FIRE FIGHTING MEASURES

**Flash point:** 390°F (199°C) - PMCC

**Autoignition temperature:** >930°F (>500°C)

**Flammable/Explosive limits - lower:** NE

**Flammable/Explosive limits - upper:** NE

**Extinguishing media:** Use water spray, carbon dioxide, foam or dry chemical.

**Special firefighting procedures:** *Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.*

**Unusual fire or explosion hazards:** Closed container may forcibly rupture under extreme heat or when contents are contaminated with water. Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot diisocyanate can be vigorous.

**Hazardous combustion products:** During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Exposure to heated diisocyanate can be extremely dangerous. Hazardous combustion products include carbon oxides, hydrogen cyanide, nitrogen oxides and isocyanate vapors.

**6. ACCIDENTAL RELEASE MEASURES**

**Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.**

**Environmental precautions:** Do not allow this material to enter sewers or waterways.

**Clean-up methods:** Contain spill. Stop leak at source if this can be done safely. Remove ignition sources. Ventilate area. Nonessential personnel should leave the area until cleanup is completed. Pump liquid into DOT-approved drums for disposal. Close, but do not seal the drums. Drumming process can generate heat. Absorb remaining liquid into inert absorbent (such as Kitty Litter or Oil Dry) and saturate with a neutralization solution [Colorimetric Laboratories Inc. (CLI) decontamination solution recommended] and place in DOT-approved drums for disposal. Apply lid loosely. Wash area with water. Keep concentrate and wash water from entering sewers or waterways.

*Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.*

**7. HANDLING AND STORAGE**

**Handling:** Do not taste or swallow. Do not get in eyes, on skin or on clothing. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Empty container may contain hazardous residues.

**Storage:** Store in a cool, dry, well ventilated place, out of direct sunlight. Avoid excessive heat. Containers

**For information on product shelf life, please review labels on container or check the Technical Data Sheet.**

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.**

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	NIOSH REL
Polymeric Diphenylmethane Diisocyanate (pMDI)	NE	NE	NE	NE
4,4'-Diphenylmethane Diisocyanate (MDI)	0.005 ppm, 0.051 mg/m3 TWA	0.02 ppm, 0.2 mg/m3 Ceiling	NE	0.005 ppm TWA; 0.020 ppm Ceiling (10 min)
2,4'-Diphenylmethane Diisocyanate (MDI)	NE	NE	NE	NE

**Engineering controls:** Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (listed above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

- Respiratory protection:** Avoid breathing vapors or mist. When airborne exposure limits are exceeded (see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.
- Eye/face protection:** Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.
- Skin protection:** Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Liquid
<b>Color:</b>	Dark brown, black
<b>Odor:</b>	Musty
<b>Odor threshold:</b>	NE
<b>pH:</b>	NA
<b>Vapor pressure:</b>	<0.0001mmHg @ 77°F (25°C)
<b>Boiling point/range:</b>	>570°F (300°F)
<b>Melting point/ range:</b>	NA
<b>Specific gravity:</b>	1.24 @ 25°C (77°F)
<b>Vapor density:</b>	8.5 (Air = 1)
<b>Flash point:</b>	390°F (199°C) - PMCC
<b>Flammable/Explosive limits - lower:</b>	NE
<b>Flammable/Explosive limits - upper:</b>	NE
<b>Autoignition temperature:</b>	>930°F (>500°C)
<b>Evaporation rate:</b>	NE
<b>Solubility in water:</b>	Insoluble - Reacts slowly with water to liberate CO <sub>2</sub> gas
<b>Partition coefficient (n-octanol/water):</b>	NA
<b>VOC content:</b>	Negligible

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	This material is stable under normal and anticipated storage and handling conditions.
<b>Hazardous polymerization:</b>	Not known to occur.
<b>Hazardous decomposition products:</b>	Oxides of carbon, nitrogen oxides, traces of MCN, HCN, MDI.
<b>Incompatibility:</b>	Contact with strong acids, alkalis and oxidizers causes violent reaction and heat.
<b>Conditions to avoid:</b>	Avoid contact with water, amines, strong bases and alcohols. Will cause some corrosion to copper alloys and aluminum. Contact with moisture, other materials that react with isocyanates or temperatures above 350°F (175°C) may cause polymerization.

**11. TOXICOLOGICAL INFORMATION**

**Toxicological Information**

Data available for this material and/or its components are summarized below:

**General Product Information:**

Isocyanates, in general, are irritating to skin, eyes and respiratory tract, causing damage to mucous membranes and are a common cause of allergic sensitization of respiratory tract. Toxicity data for this material is based on components below:

**Component Data:**

**Polymeric Diphenylmethane Diisocyanate (pMDI)**

**LD50/LC50:**

Oral: LD50: >2000 mg/kg (rat); Inhalation: LC50: 490 mg/m<sup>3</sup>, 4h (rat, M/F); Dermal: Slightly irritating >9400 mg/kg (rabbit).

**CHRONIC:**

90 days, inhalation: NOAEL: 1 mg/m<sup>3</sup>, (rat, M/F, 6h/d, 5d/w): Irritation to lungs and nasal cavity. 2 years inhalation: NOAEL: 0.2, (rat, M/F, 6h/d, 5d/w): Irritation to lungs and nasal cavity.

**MUTAGENICITY:**

Genetic Toxicity in Vitro: Bacterial - gene mutation assay: negative (Salmonella typhimurium, Metabolic Activation: with/without).

**CARCINOGENICITY (see cancer lists below):**

Rat, M/F, inhalation, 2 years, 6h/d, 5d/w: Exposure to a level of 6 mg/m<sup>3</sup> polymeric MDI was related to the occurrence of lung tumors. This level is significantly over the TLV for MDI.

**DEVELOPMENTAL TOXICITY/TERATOGENICITY:**

Rat, F, inhalation, gestation days 6-15, 6h/d, NOAEL (teratogenicity): 12 mg/m<sup>3</sup>, NOAEL (maternal): 4 mg/m<sup>3</sup>: No teratogenic effects observed at doses tested. Fetotoxicity seen only with maternal toxicity.

**4,4'-Diphenylmethane Diisocyanate (MDI)**

**LD50/LC50:**

Inhalation: LC50: 369 mg/m<sup>3</sup>, 4 h (rat, M/F), LC50: >2240 mg/m<sup>3</sup>, 1 h (rat). Dermal: LD50: >10000 mg/kg (rabbit). Skin: rabbit, Draize Test: slightly irritating. Eye: rabbit, Draize Test: slightly irritating. Sensitization (dermal): (guinea pig, Maximization Test: Sensitizer. Sensitization (inhalation): (guinea pig): Sensitizer.

**CHRONIC:**

90 days, inhalation: NOAEL: 0.3 mg/m<sup>3</sup>, (rat, M/F, 18 h/d, 5 d/w): Irritation to lungs and nasal cavity.

**MUTAGENICITY:**

Genetic Toxicity in Vitro: Ames: (Salmonella typhimurium, Metabolic Activation: with/without): Positive and negative results were reported. The use of certain solvents which rapidly hydrolyze diisocyanates is suspected of producing the positive mutagenicity results. Genetic Toxicity in Vivo: Micronucleus Assay: (mouse): Negative.

**CARCINOGENICITY (see cancer lists below):**

Rat, F, inhalation, 2 years, 17h/d, 5 d/w: negative

**Cancer Lists**

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen
Polymeric Diphenylmethane Diisocyanate (pMDI)	No	Group 3 Not classifiable as to its carcinogenicity to humans	Group D, not classifiable
4,4'-Diphenylmethane Diisocyanate (MDI)	No	Group 3 Not classifiable as to its carcinogenicity to humans	No
2,4'-Diphenylmethane Diisocyanate (MDI)	No	No	No

**Health Effects**

<b>Hazardous components</b>	<b>Health Effects / Target Organs</b>
Polymeric Diphenylmethane Diisocyanate (pMDI)	Respiratory sensitization, Asthma, hypersensitivity, pneumonitis, irritation / Eyes, Nose, Throat, Skin, Respiratory
4,4'-Diphenylmethane Diisocyanate (MDI)	Asthma [HE9 Respiratory Effects Other Than Irritation---Respiratory sensitization (asthma or other)] Irritation-Eye, Nose, Throat, Skin---Marked (HE14) / Respiratory system, eyes
2,4'-Diphenylmethane Diisocyanate (MDI)	Not Available

**12. ECOLOGICAL INFORMATION**

**Ecotoxicological Information**

Data available for this material and/or its components are summarized below:

**General Product Information:**

Not Available

**Component Data:**

Not available

**13. DISPOSAL CONSIDERATIONS**

**Information provided is for unused product only.**

**Recommended method of disposal:**

Incineration at an approved facility is the preferred method of disposal for this product.

*Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state and local regulations. Empty containers retain product residue. Note: Chemical additions to, processing of, or otherwise altering this material may render information in this document to be incomplete, inaccurate or otherwise inappropriate for waste management purposes. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.*

**Disposal Regulatory**

No EPA Waste Numbers are applicable for this product's components.

*It is the responsibility of the waste generator to determine if the waste meets the definition of a hazardous waste as promulgated at 40 CFR Part 261 subpart C.*

**14. TRANSPORT INFORMATION**

**U.S. Department of Transportation Ground (49 CFR)**

**Proper shipping name:** Single containers less than 5,000 lbs are not regulated.

**Hazard class or division:**

**Identification number:**

**Packing group:**

**15. REGULATORY INFORMATION**

**United States Regulatory Information**

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

**URETHANE ASPHALT HARDENER PART B**  
**MATERIAL SAFETY DATA SHEET**

**SARA 311/312:** Acute Health Hazard  
 Chronic Health Hazard

**Applicable component data listed below:**

**TSCA 12(b) Export Notification** None listed

**CERCLA/SARA Section 302 EHS** None listed

**Section 304 EHS RQ** None listed

**CLCRA RQ**

4,4'-Diphenylmethane Diisocyanate (MDI) 5,000 LBS

**Section 313**

	<b>Category</b>	<b>de minimis concentration</b>
Polymeric Diphenylmethane Diisocyanate (pMDI)	Diisocyanates	0.01
4,4'-Diphenylmethane Diisocyanate (MDI)	Diisocyanates	0.01

**RCRA CODE** None listed

**CAA 1129(r) TQ** None listed

**State Regulations**

<b>State Lists (Components on one or more lists)</b>	<b>CA</b>	<b>NJ</b>	<b>PA</b>	<b>RI</b>	<b>NY</b>	<b>MA</b>	<b>MN</b>
Polymeric Diphenylmethane Diisocyanate (pMDI)	No	Yes	No	No	No	No	No
4,4'-Diphenylmethane Diisocyanate (MDI)	No	Yes	Yes	Yes	Yes	No	Yes

**California Proposition 65**

This product contains the following chemicals known to the State of California to cause cancer or reproductive toxicity:

None listed

**Canada Regulatory Information**

	<b>WHMIS Status</b>	<b>Hazard class(s)</b>
Polymeric Diphenylmethane Diisocyanate (pMDI)	Disclosure (0.1%)	D1A, D2A, D2B
4,4'-Diphenylmethane Diisocyanate (MDI)	Disclosure (0.1%)	D1A, D2A, D2B

**16. OTHER INFORMATION**

**Revision Information**

**Revision Date:** 6/1/2011  
**Supersedes Revision Dated:** 9/1/2009  
**Revision Number:** 5.000  
**Revision Summary:** New format

**Key:** NE = Not Established, NA = Not Applicable

**State Lists reviewed (Sec. 15):**

CA Title 8, §339. The Hazardous Substances List  
NJ Right to Know Hazardous Substance List  
PA Chapter 323. Hazardous Substance List  
RI Rhode Island Hazardous Substance List  
NY Part 597: List of Hazardous Substances  
MA Massachusetts Oil and Hazardous Material List  
MN 5206.400 Hazardous Substances

**Prepared by:** CED

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