PRODUCT: DESMODUR VL

Section 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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PRODUCT NAME: DESMODUR VL
CHEMICAL FAMILY: Aromatic polyisocyanate.
MATERIAL USE: Coatings.

Section 02: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Ingredients</th>
<th>%</th>
<th>Exposure Limit</th>
<th>C.A.S.#</th>
<th>LD/50, Route,Species</th>
<th>LC/50 Route,Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIPHENYLMETHANE-DIISOCYANATE, ISOMERS AND HOMOLOGUES</td>
<td>&gt;99.5</td>
<td>Not available</td>
<td>9016-87-9</td>
<td>&gt; 15,000 mg/kg (oral rat)</td>
<td>Approx. 490 mg aerosol/m3 (4hr, rat)</td>
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Section 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY: Eye contact. Skin contact. Inhalation.

EYE CONTACT: Product liquid, aerosols or vapours are irritating. Can cause tearing, redening and swelling. May cause temporary corneal injury.

SKIN CONTACT: Irritant. Can cause reddening, itching, and swelling. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Contact with MDI can cause discoloration. Cured material is difficult to remove.

SKIN ABSORPTION: Not available.

INHALATION (ACUTE): Isocyanate vapour/mists at concentration above the exposure limits can irritate (burning sensation) the mucous membranes in the respiratory tract. Causes runny nose, sore throat, coughing, chest discomfort, difficult breathing and reduced pulmonary functioning. Persons with pre-existing, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema. Chemical or hypersensitive pneumonitis, with flu-like symptoms has also been reported. These symptoms can be delayed up to several hours after exposure. Effects are usually reversible.

INGESTION: May cause irritation. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea.

EFFECTS OF CHRONIC EXPOSURE: Prolonged contact may cause reddening, swelling, rash, scaling, blistering, and in some cases, skin sensitization. As a result of previous repeated overexposure or a single large dose, certain individuals develop sensitization which will cause them to react to a later exposure to product at levels well below the TLV. Symptoms including chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed. There are reports that once sensitized, an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Prolonged or repeated exposure may cause lung damage, including a decrease in lung function. Prolonged vapour contact may cause conjunctivitis.

Section 04: FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes, keeping eyelids open, with plenty of water for at least 15 minutes.

SKIN CONTACT: Immediately flush skin with plenty of soap and water. Remove contaminated clothing. Wash clothing before reuse.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen, obtain medical attention.

INGESTION: Do not induce vomiting. Immediately call a physician. Rinse mouth with water. Never give anything by mouth to an unconscious person.
Section 04: FIRST AID MEASURES

ADDITIONAL INFORMATION.................. In all cases, if irritation persists seek medical attention. Note to physician: Eye: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapours have produced reversible corneal epithelial edema impairing vision. Skin: This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound. Respiratory: This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

Section 05: FIRE FIGHTING MEASURES

FLASH POINT (deg C), METHOD.................. Approx. 220. (DIN EN 22719).
AUTO IGNITION TEMPERATURE (deg C)... > 400. (DIN 51794).
UPPER FLAMMABLE LIMIT (% VOL)........... Not available.
LOWER FLAMMABLE LIMIT (% VOL).......... Not available.
EXTINGUISHING MEDIA...................... Carbon dioxide. Dry chemical. Foam. In cases of larger fires, water spray should be used. By fire: Protect against potentially toxic and irritating fumes.
HAZARDOUS COMBUSTION PRODUCTS........... Not available.
SENSITIVITY TO MECHANICAL IMPACT...... Not applicable.
SENSITIVITY TO STATIC DISCHARGE....... Not applicable.
SPECIAL FIRE FIGHTING PROCEDURES........ Firefighter should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes. During a fire, isocyanate vapours and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Cool fire-exposed containers with cold water spray. Heat will cause pressure buildup and may cause explosive rupture.

Section 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL....................................... Evacuate all non-essential personnel. Ventilate. Eliminate all sources of ignition. Dike area to prevent spreading. Wear full protective equipment, including respiratory equipment during clean-up.
MAJOR SPILLS................................ If transportation spill occurs, call CANUTEC at (613) 996-6666. If temporary control of isocyanate vapour is required, a blanket of protein foam may be placed over spill. Large quantities may be pumped into closed, but not sealed, containers for disposal.
MINOR SPILLS.................................. Cover spill area with suitable absorbent material. Pour decontamination solution over spill and allow to react for at least 10 minutes. Shovel into suitable unsealed containers, transport to a well-ventilated area (outside), and add further amounts of decontamination solution. Mixture of water (80%) with non-ionic surfactant Tergitol TMN-10 (20%), or; water (90%), concentrated ammonia (3-8%) and detergent (2%). Add about 10 parts of neutralizer per part of isocyanate, with mixing. Allow to stand uncovered for 72 hours to let carbon dioxide escape.
CLEAN UP..................................... Decontaminate floor with decontamination solution, letting stand for at least 15 minutes.

Section 07: HANDLING AND STORAGE

HANDLING PROCEDURES.......................... Avoid skin and eye contact. Avoid breathing vapours. Use adequate ventilation. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odour) are not adequate to prevent chronic overexposure from inhalation. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapour or spray mist. Wash thoroughly after handling. Employee education and training are important.
STORAGE NEEDS.............................. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Exposure to vapours of heated isocyanates can be extremely dangerous.

Section 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT
EYE / TYPE.................................. Chemical safety goggles. Chemical safety goggles and full faceshield if a splash hazard exists. Contact lenses should not be worn when working with this chemical.
RESPIRATORY / TYPE.......................... Whenever concentrations of isocyanates exceed the TLV or are not known, respiratory protection must be worn. A positive pressure, supplied-air respirator or a self-contained breathing apparatus is recommended. An air-purifying respirator is not generally recommended based on the poor warning properties of the product. At least an air-purifying respirator equipped with an organic vapour cartridge and particulate pre-filters must be worn. However, this should be permitted only for short periods of time (< 1 hour) at relatively low concentrations (at or near the TLV). Do not exceed the use limits of the respirator.
**Section 08: EXPOSURE CONTROLS / PERSONAL PROTECTION**

- **CLOTHING/TYPE**: Wear adequate protective clothes. Wear long sleeves and trousers to prevent dermal exposure.
- **FOOTWEAR/TYPE**: Not available.
- **OTHER/TYPE**: Eyewash fountain. Emergency shower should be in close proximity. Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees on the safe use and handling of the product.

**VENTILATION REQUIREMENTS**: Local exhaust should be used to maintain levels below the TLV whenever isocyanate is processed, heated or spray applied. Avoid breathing mists; if general ventilation or local exhaust is inadequate, persons exposed to mists should wear approved breathing devices. Wear an appropriate, properly fitted respirator when contaminant levels exceed the recommended exposure limits.

**MONITORING**: Exposure levels must be monitored by accepted monitoring techniques to ensure that the TLV is not exceeded.

**MEDICAL SURVEILLANCE**: Medical supervision of all employees who handle or come in contact with isocyanates is recommended. These should include preemployment and periodic medical examinations with pulmonary function test (FEV, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrant skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

**Section 09: PHYSICAL AND CHEMICAL PROPERTIES**

- **PHYSICAL STATE**: Liquid.
- **ODOUR**: Slightly musty odour.
- **SPECIFIC GRAVITY**: 1.22. @ 20 deg C.
- **ODOUR THRESHOLD (ppm)**: Not available.
- **VAPOUR PRESSURE (mm Hg)**: < 0.00001 mmHg at 25 deg C (MDI).
- **VAPOUR DENSITY (AIR=1)**: Not available.
- **BOILING POINT (deg C)**: Not available.
- **pH**: Not available.
- **SOLUBILITY IN WATER (% W/W)**: Insoluble. Reacts slowly with water to liberate CO2 gas.
- **COEFFICIENT OF WATER/OIL**: Not available.
- **DISTRIBUTION**: < 0.

**Section 10: STABILITY AND REACTIVITY**

- **REACTIVITY CONDITIONS**: Contact with moisture and other materials that react with isocyanates. Temperatures above 177 C may cause polymerization.
- **INCOMPATIBILITY**: Water, amines, strong bases, alcohols.
- **HAZARDOUS POLYMERIZATION**: May occur with. Contact with moisture or other materials which react with isocyanates may cause polymerization. Or temperatures over 177 C.

**Section 11: TOXICOLOGICAL INFORMATION**

- **NOTE**: Toxicity data based on polymeric MDI.
- **ACUTE ORAL TOXICITY (LD50)**: > 15000 mg/kg (rat).
- **DERMAL TOXICITY (LD50)**: Not available.
- **INHALATION LC50**: 490 mg/m3 (rat/4 hr).
- **SENSITIZING CAPABILITY OF MATERIAL**: Isocyanate is known to cause skin and respiratory sensitization in humans. Animal tests have indicated that respiratory sensitization can result from skin contact with disocyanates. This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.
- **CARCINOGENICITY OF MATERIAL**: Noteratogenic effects observed at doses tested. Fetotoxicity seen only with maternal toxicity.
- **TERATOGENICITY**: Bacterial - gene mutation assay: negative (Salmonella typhimurium, Metabolic Activation: with/without).
- **MUTAGENICITY**: Not available.

**Section 12: ECOLOGICAL INFORMATION**

- **NOTE**: Ecotoxicity data based on polymeric MDI.
- **BIODEGRADABILITY**: 0%. Exposure time: 28 days. Not readily biodegradable.
- **FISH TOXICITY (1)**: LC50: > 1000 mg/l.
- **TESTING TIME (1)**: 96 hr.
- **TEST SPECIES (1)**: Danio rerio.
- **FISH TOXICITY (2)**: EC50: > 1000 mg/l.
- **TESTING TIME (2)**: 24 hr.
- **TEST SPECIES (2)**: Daphnia magna.
Section 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL....................................... Dispose of waste in accordance with all applicable federal, provincial and local regulations.
Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. Do not heat or cut empty containers with electric or gas torch. Vapours and gases may be toxic.

Section 14: TRANSPORT INFORMATION

TDG CLASSIFICATION.................................. Non regulated.

Section 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION................................ Controlled. D2A, D2B. This product has been classified in accordance with subsection 23(1) of the Controlled Product Regulations (CPR) under the Workplace Hazardous Materials Information System (WHMIS).
CEPA STATUS.......................................... On Domestic Substances List (DSL).

Section 16: OTHER INFORMATION

NOTE:...................................................... This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Bedford Industries Ltd. The data on this sheet relates only to the specific material designated herein. Bedford Industries Ltd. assumes no legal responsibility for use or reliance upon these data.
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