

# SAFETY DATA SHEET



## Pecora-Deck™ 804 Intermediate Coat

### PART I *What is the material and what do I need to know in an emergency?*

#### 1. PRODUCT IDENTIFICATION

##### IDENTIFICATION of the SUBSTANCE or PREPARATION

TRADE NAME (AS LABELED):	Pecora-Deck™ 804 Intermediate Coat
PRODUCT DESCRIPTION:	Urethane
CHEMICAL NAME/CLASS:	Urethane Based Coating
SYNONYMS:	Pecora-Deck™ 804
RELEVANT USE:	General Polyurethane Sealant
USES ADVISED AGAINST:	Other Than Relevant Use

##### COMPANY/UNDERTAKING IDENTIFICATION:

SUPPLIER/MANUFACTURER'S NAME:	Pecora Corporation
ADDRESS:	165 Wambold Road, Harleysville, PA 19438
EMERGENCY PHONE:	800-424-9300 (CHEMTREC, 24-hours)
BUSINESS PHONE:	215-723-6051 (Mon-Fri, 8 AM-5 PM ET)
PREPARATION DATE:	January 7, 2013
REVISION DATE:	November 22, 2013

This product is sold for commercial use. This SDS has been developed to address safety concerns of those individuals working with bulk quantities of this material, as well as those of potential users of this product in industrial/occupational settings. ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and Canadian WHMIS [Controlled Products Regulations] and the Global Harmonization Standard required information is included in appropriate sections based on the U.S. ANSI Z400.1-2010 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

#### 2. HAZARD IDENTIFICATION

**GLOBAL HARMONIZATION LABELING AND CLASSIFICATION:** This product has been classified per GHS Standards.

**Classification:** Flammable Liquid Cat. 3, Carcinogenic Cat. 2, Germ Cell Mutagenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Irritation Cat. 2, Respiratory Sensitizer Cat. 1, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 3

**Signal Word:** Danger

**Hazard Statement Codes:** H226, H351, H341, H331, H315, H319, H335, H317, H334, H412

**Precautionary Statement Codes:** P201, P202, P210, P233, P240, P241, P242, P243, P260, P264, P270, P271, P272, P273, P280, P284, P308 + P313, P303 + P361 + P353, P370 + P378, P304 + P340, P342 + P311, P305 + P351 + P338, P337 + P313, P302 + P352, P333 + P313, P362 + P364, P312, P321, P403 + P233 + P235, P405, P501

**Hazard Symbols/Pictograms:** GHS02, GHS06, GHS08



##### EMERGENCY OVERVIEW:

**PHYSICAL DESCRIPTION:** This product is a flammable, colored, viscous liquid with an odor characteristic of isocyanates.

**HEALTH HAZARDS:** DANGER! Inhalation of vapors may be harmful or fatal. Harmful or fatal if swallowed. This product can cause irritation by all routes of exposure. Eye irritation may be severe. Chronic inhalation may cause lung damage. May cause toxic systemic effects by skin absorption. Can cause skin and respiratory sensitization and allergic reaction. Contains compounds that are suspect carcinogens and of crystalline silica, a known human carcinogen by inhalation. Contains compound that is suspect mutagen. Contains compounds which can cause harm to aquatic organisms.

**FLAMMABILITY HAZARD:** This product is combustible and can ignite if exposed to high temperature or direct flame.

**REACTIVITY HAZARD:** Contact with water produces heat, carbon dioxide and urea polymers; reaction can be vigorous. Closed containers can rupture violently if contaminated with water or if involved in a fire. Due to the Polyether Diol component, this product may form unstable or flammable peroxides on prolonged exposure to air if stabilizer is depleted.

**ENVIRONMENTAL HAZARD:** This product has not been tested for environmental impact. All release to the environment should be avoided. Contains compounds that can cause harm to aquatic organisms.

##### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS®)

Health	2*
Flammability	2
Physical Hazard	1

See Section 16 for definitions of ratings

0 = Minimal      3 = Serious  
1 = Slight        4 = Severe  
2 = Moderate     \* = Chronic

HMIS® is a registered trademark of the National Paint and Coatings Association.

**CANADIAN WHMIS CLASSIFICATION:** Classes B2, D1A/D2A and Class D2B, See Section 15 (Regulatory Information) for all classification details.

**U.S. OSHA REGULATORY STATUS:** This material is classified as hazardous under OSHA regulations.

### 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical Name	CAS #	W/W%	GHS Classification Hazard Statements
Polyalkylene Glycol	9003-11-6	20.0-40.0	Classification: Not Applicable Hazard Statement Codes: Not Applicable
Kaolin	1332-58-7	10.0-20.0	Classification: Not Applicable Hazard Statement Codes: Not Applicable
2,4-Toluene Diisocyanate 2,6-Toluene Diisocyanate	584-84-9 91-08-7	10.0-20.00	Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Irritation Cat. 2, Respiratory Sensitizer Cat. 1, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 3 Hazard Statement Codes: H351, H330, H319, H335, H334, H317, H412
Polyether Driol	25322-69-4	10.0-15.0	Classification: Not Applicable Hazard Statement Codes: Not Applicable
Naphtha Petroleum Hydrotreated Light	64742-47-8	8.0-15.0	SELF CLASSIFICATION Classification: Carcinogenic Cat. 2 Hazard Statement Codes: H351
Talc	14807-96-6	8.0-10.0	Classification: Not Applicable Hazard Statement Codes: Not Applicable
Crystalline Silica, Quartz	14808-60-7	1.0-5.0	SELF CLASSIFICATION Classification: Carcinogenic Cat. 1B Hazard Statement Codes: H350i
Pseudocumene	95-63-6	1.0-5.0	Classification: Flammable Liquid Cat. 3, Acute Inhalation Toxicity Cat. 4, Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Aquatic Chronic Toxicity Cat. 2 Hazard Statement Codes: H226, H332, H315, H319, H335, H411
1,4-Butanediol	110-63-4	1.0-5.0	SELF CLASSIFICATION Classification: Acute Oral Toxicity Cat. 4, STOT (Inhalation-Narcotic Effect) SE Cat. 3 Hazard Statement Codes: H303, H336
Calcium Carbonate (Natural)	1317-65-3	1.0-3.0	Classification: Not Applicable Hazard Statement Codes: Not Applicable
Titanium Dioxide	13463-67-7	0.5-2.0	SELF CLASSIFICATION Classification: Carcinogenic Cat. 2 Hazard Statement Codes: H351
Diisocyanate Mixture including:			
Diphenylmethane 4,4'-Diisocyanate	101-68-8		Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Irritation Cat. 2, Respiratory Sensitizer Cat. 1, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 3 Hazard Statement Codes: H351, H330, H319, H335, H334, H317, H412
Polymeric Diphenylmethane Diisocyanate	9016-87-9	0.19	SELF CLASSIFICATION Classification: Carcinogenic Cat. 2, Acute Oral Toxicity Cat. 5, Acute Inhalation Toxicity Cat. 4, Skin Irritation Cat. 2, Eye Irritation Cat. 2B, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Sensitization Cat. 1, Respiratory Sensitization Cat. 1 Hazard Statement Codes: H361, H303, H332, H315 + H320, H335, H317, H334
Diphenylmethane-2,4-Diisocyanate	5873-54-1		Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Irritation Cat. 2, Respiratory Sensitizer Cat. 1, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 3 Hazard Statement Codes: H351, H330, H319, H335, H334, H317, H412
Isocyanates, Reaction Product Of Polyol With Methylenediphenyl Diisocyanate	150449-03-9		SELF CLASSIFICATION Classification: Skin Sensitization Cat. 1B Hazard Statement Codes: H317
Other proprietary and trace components. Each of the other components is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance	Classification: Not Applicable Hazard Statement Codes: Not Applicable

See Section 16 for full text of Ingredient Hazard and Precautionary Statements

## PART II *What should I do if a hazardous situation occurs?*

### 4. FIRST-AID MEASURES

**PROTECTION OF FIRST AID RESPONDERS:** Rescuers should not attempt to retrieve victims of exposure to this material without adequate personal protective equipment. Rescuers should be taken for medical attention, if necessary. Fire protective gear may be necessary.

**DESCRIPTION OF FIRST AID MEASURES:** Remove victim(s) to fresh air, as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Remove and isolate contaminated clothing and shoes. Seek immediate medical attention. Take copy of label and SDS to physician or other health professional with victim(s).

**INHALATION:** If mists, sprays or fumes of this material are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

**SKIN EXPOSURE:** If the material contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 20 minutes. Do not interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

**EYE EXPOSURE:** If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 20 minutes. Do not interrupt flushing.

**INGESTION:** If this material is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directly by medical personnel. Have victim rinse mouth with water or give several cupfuls of water, if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

#### 4. FIRST-AID MEASURES (Continued)

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Acute or chronic respiratory conditions, skin and respiratory allergies and asthma may be aggravated by overexposure to this product.

**INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED:** Treat symptoms and eliminate overexposure. Be observant for pulmonary edema. Copiously irrigate contaminated skin and eyes with saline. Non-cardiogenic pulmonary edema and bronchospasm are the most immediate serious clinical consequences of isocyanate exposure. Markedly symptomatic patients should receive oxygen, ventilatory support, and an intravenous line. Treatment for asthma includes inhaled sympathomimetics (salbutamol, metaproterenol), intravenous theophylline, parenteral sympathomimetics (epinephrine, terbutaline), and steroids.

#### 5. FIRE-FIGHTING MEASURES

**FLASH POINT (TCC):** 42.2°C (108°F)

**AUTOIGNITION:** Not determined.

**FLAMMABLE LIMITS IN AIR:** LEL: 1% UEL: 7%

**EXTINGUISHING MEDIA:**

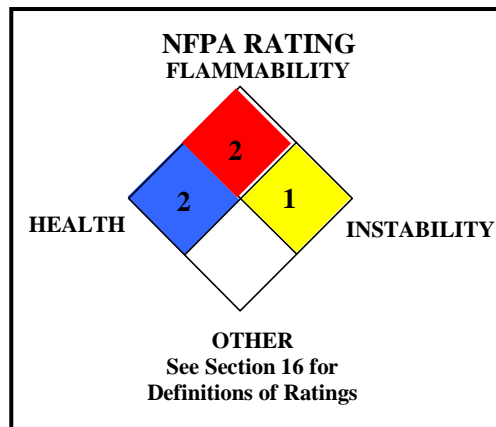
**SUITABLE EXTINGUISHING MEDIA:** Use materials appropriate for surrounding materials. Water should be used for cooling of containers only due to reaction with water.

**UNSUITABLE EXTINGUISHING MEDIA:** Water and halogenated media.

**PROTECTION OF FIREFIGHTERS:**

**SPECIAL HAZARDS ARISING FROM THE PRODUCT:** This is a flammable liquid which is also toxic by inhalation and skin contact and so presents a contact hazard to fire-fighters. This compound reacts with water to form urea polymers, heat and carbon dioxide. Products of thermal decomposition are highly toxic (refer to Section 10 Stability and Reactivity). This reaction can be vigorous. Not sensitive to mechanical impact under normal conditions. Closed containers may develop pressure and rupture in event of fire or if contaminated with water and when exposed to the heat of a fire.

**SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS:** Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.



#### 6. ACCIDENTAL RELEASE MEASURES

**PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES:** An accidental release may result in a fire. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Eliminate any possible sources of ignition, and provide maximum explosion-proof ventilation. Use only non-sparking tools and equipment during the response. The atmosphere must at least 19.5 percent Oxygen before non-emergency personnel can be allowed in the area without Self-Contained Breathing Apparatus and fire protection. Avoid contact with water.

**PERSONAL PROTECTIVE EQUIPMENT:** Responders should wear the level of protection appropriate to the type of chemical released, the amount of the material spilled, and the location where the incident has occurred.

**Small Spills:** For releases of 1 drum or less, Level D Protective Equipment (gloves, chemical resistant apron, boots, and eye protection) should be worn.

**Large Spills:** Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit, fire-retardant clothing and boots, hard hat, and Self-Contained Breathing Apparatus.**

**METHODS FOR CLEAN-UP AND CONTAINMENT:**

**All Spills:** Access to the spill area should be restricted. Spread should be limited by gently covering the spill with polypads. Absorb spilled liquid with clay, sand, polypads, or other suitable inert absorbent materials. All contaminated absorbents and other materials should be placed in an appropriate container and seal. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). Dispose of recovered material and report spill per regulatory requirements. Remove all residue before decontamination of spill area. Clean spill area with soap and copious amounts of water. Monitor area for combustible vapor levels and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, and that levels are below applicable LELs (see Section 5 – Fire Fighting Measures) before non-response personnel are allowed into the spill area. Purge equipment with inert gas prior to reuse.

**ENVIRONMENTAL PRECAUTIONS:** Minimize use of water to prevent environmental contamination. Prevent spill or rinsate from contaminating storm drains, sewers, soil or groundwater. Place all spill residues in a suitable container and seal. Do not discharge effluent containing this product into streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

**OTHER INFORMATION:** U.S. regulations may require reporting of spills of this material that reach surface waters if a sheen is formed. If necessary, the toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802.

**REFERENCE TO OTHER SECTIONS:** See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.

# PART III

How can I prevent hazardous situations from occurring?

## 7. HANDLING and STORAGE

**PRECAUTIONS FOR SAFE HANDLING:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid contact with eyes, skin, and clothing. Avoid breathing fumes, vapors or mist. Do not taste or swallow. Use only with adequate ventilation. Wash hands after handling this product. Contaminated clothing needs to be laundered prior to reuse. Keep away from heat and flame. In the event of a spill, follow practices indicated in Section 6: ACCIDENTAL RELEASE MEASURES.

**CONDITIONS FOR SAFE STORAGE:** Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours. Storage areas should be made of fire resistant materials. **Local Fire Departments should be notified of the storage of this product on site. Storage and processing areas of this product should be identified with a NFPA 704 placard (diamond) large enough to be seen from a distance.** Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Refer to NFPA 30, *Flammable and Combustible Liquids Code*, for additional information on storage. Have appropriate extinguishing equipment in the storage area (such as sprinkler systems or portable fire extinguishers). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Empty containers may contain residual product; therefore, empty containers should be handled with care. Store container below 27°C (80°F) to avoid possible reactions related to heat and overpressure of containers.

**PRODUCT USE:** This product is used as a urethane activator. Follow all industry standards for use of this product.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

### EXPOSURE LIMITS/CONTROL PARAMETERS:

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below.

### OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS #	Guideline	Value
1,4-Butanediol	110-63-4	NE	NE
Crystalline Silica/Quartz/Cristobalite	14808-60-7 14464-46-1	ACGIH TLV TWA OSHA PEL TWA NIOSH REL TWA	0.025 mg/m <sup>3</sup> Respirable Fraction 30 mg/m <sup>3</sup> / % SiO <sub>2</sub> + 2 Total Dust; 10 mg/m <sup>3</sup> / % SiO <sub>2</sub> + 2 Respirable Fraction 0.05 mg/m <sup>3</sup> (Respirable Dust)
Diphenylmethane-2,4-Diisocyanate	5873-54-1	NE	NE
Diphenylmethane 4,4'-Diisocyanate	101-68-8	ACGIH TLV TWA OSHA PEL STEL NIOSH REL TWA NIOSH REL STEL NIOSH IDLH DFG MAK TWA DFG MAK PEAK	0.005 ppm 0.02 ppm (ceiling) 0.005 ppm 0.02 ppm (ceiling) 15 minutes 75 mg/m <sup>3</sup> 0.05 ppm (inhalable fraction) 1•MAK 15 minute average value, 1-hr interval, 4 per shift; 0.1 ppm (ceiling)
Isocyanates, Reaction Product of Polyol with Methylenediphenyl Diisocyanate	150449-03-9	NE	NE
Kaolin	1332-5-7	ACGIH TLV TWA OSHA PEL TWA NIOSH REL TWA	2 mg/m <sup>3</sup> 15 mg/m <sup>3</sup> (total dust); 5 mg/m <sup>3</sup> (respirable fraction) 10 mg/m <sup>3</sup> (total dust); 5 mg/m <sup>3</sup> (respirable fraction)
Mica	12001-26-2	ACGIH TLV TWA OSHA PEL TWA NIOSH REL TWA NIOSH IDLH	3 mg/m <sup>3</sup> respirable fraction 20 mppcf (<1% crystalline silica); vacated 1989 PEL: 3 mg/m <sup>3</sup> 3 mg/m <sup>3</sup> (respirable dust containing < 1% quartz) 1500 mg/m <sup>3</sup>
Naphtha Petroleum Hydrotreated Light	64742-47-8	DFG MAK TWA DFG MAK PEAK	140 mg/m <sup>3</sup> 2•MAK 15 minute average value, 1-hr interval 4 per shift
Polyether Diol	25322-69-4	NE	NE
Polyalkylene Glycol	9003-11-6	NE	NE
Pseudocumene	95-63-6	ACGIH TLV TWA OSHA PEL TWA NIOSH REL TWA DFG MAK TWA DFG MAK PEAK	25 ppm (mixed isomers) 25 ppm (vacated 1989 PEL) 25 ppm 20 ppm 2•MAK 15 minute average value, 1-hr interval 4 per shift
Talc	14807-96-6	ACGIH TLV TWA OSHA PEL TWA/STEL NIOSH REL TWA DFG MAK TWA	2 mg/m <sup>3</sup> respirable fraction 20 mppcf (containing < 1% quartz) 2 mg/m <sup>3</sup> and < 1% quartz respirable fraction 1.5 mg/m <sup>3</sup> respirable fraction
Toluene-2,4-Diisocyanate 2,6-Diisocyanate	584-84-9 91-08-7	ACGIH TLV TWA ACGIH TLV STEL OSHA PEL STEL DFG MAK TWA	0.005 ppm (NIC: 0.001), Sensitizer 0.02 ppm (NIC: 0.003), Sensitizer 0.02 ppm (ceiling) [CAS# 584-84-9] Danger of Sensitization of the airways.
Titanium Dioxide	13463-67-7	ACGIH TLV TWA OSHA PEL TWA	10 mg/m <sup>3</sup> 15 mg/m <sup>3</sup>

NE = Not Established. See Section 16 for Definitions of Terms Used.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including the Respiratory Protection Standard (29 CFR 1910.134), Eye Protection Standard 29 CFR 1910.13, the Hand Protection Standard 29 CFR 1910.138, and the Foot Protection Standard 29 CFR 1910.136), equivalent standards of Canada (including the Canadian CSA Respiratory Standard Z94.4-93-02, the CSA Eye Protection Standard Z94.3-M1982, Industrial Eye and Face Protectors and the Canadian CSA Foot Protection Standard Z195-M1984, Protective Footwear). Please reference applicable regulations and standards for relevant details.

**EYE/FACE PROTECTION:** Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations.

**SKIN PROTECTION:** Wear chemical impervious gloves (e.g., Nitrile or Neoprene). Use triple gloves for spill response. If necessary, refer to appropriate regulations.

**BODY PROTECTION:** Use body protection appropriate for task (e.g., lab coat, coveralls, Tyvek suit). Full-body chemical protection may be necessary. If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in appropriate regulations.

**RESPIRATORY PROTECTION:** If mists or sprays from this product are created during use, use appropriate respiratory protection. If necessary, use only respiratory protection authorized in appropriate regulations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under appropriate regulations. The following NIOSH respiratory equipment guidelines for components that present an inhalation hazard are presented for additional assistance in respiratory protective equipment selection.

### **4,4-DIPHENYLMETHANE DIISOCYANATE**

#### **CONCENTRATION**

#### **RESPIRATORY PROTECTION**

Up to 0.5 mg/m<sup>3</sup>: Any Supplied-Air Respirator (SAR).

Up to 1.25 mg/m<sup>3</sup>: Any SAR operated in a continuous-flow mode.

Up to 2.5 mg/m<sup>3</sup>: Any Self-Contained Breathing Apparatus with a full facepiece, or any SAR with a full facepiece.

Up to 75 mg/m<sup>3</sup>: Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

### **NAPHTHAS**

#### **CONCENTRATION**

#### **RESPIRATORY PROTECTION**

Up to 1000 mg/m<sup>3</sup>: Any Chemical Cartridge Respirator with organic vapor cartridge(s), or any Supplied-Air Respirator (SAR), or any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s).

Up to 5000 mg/m<sup>3</sup>: Any Chemical Cartridge Respirator with a full facepiece and organic vapor cartridge(s), or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any PAPR with a tight-fitting facepiece and organic vapor cartridge(s), or any Self-Contained Breathing Apparatus with a full facepiece, or any SAR.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

### **2,4-TOLUENEDIISOCYANATE**

#### **CONCENTRATION**

#### **RESPIRATORY PROTECTION**

Based on NIOSH REL at Concentrations Above the NIOSH REL, or Where There is No REL, at Any Detectable Concentration: Any Self-Contained Breathing Apparatus (SCBA) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any Supplied-Air Respirator (SAR) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

## 9. PHYSICAL and CHEMICAL PROPERTIES

**FORM:** Viscous liquid.

**MOLECULAR WEIGHT:** Mixture.

**ODOR:** Characteristic of isocyanates.

**SPECIFIC GRAVITY:** 1.2

**PERCENT VOLATILE BY VOLUME:** 12-22%

**FLASH POINT (TCC):** 42.2°C (108°F)

**WATER SOLUBILITY:** Negligible, may react.

**OTHER SOLUBILITIES:** Not available.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not available.

**MELTING POINT:** Not available.

**HOW TO DETECT THIS SUBSTANCE (WARNING PROPERTIES):** The appearance and odor of this product may act as warning properties in the event of an accidental release.

**VOC (less water and exempt):** <225 g/L

**COLOR:** Colored.

**MOLECULAR FORMULA:** Mixture.

**ODOR THRESHOLD:** Not available.

**pH:** Not available.

**VOLATILE ORGANIC CONTENT:** 214 g/L

**BOILING POINT:** 288-252°C (320-486°F)

**VAPOR PRESSURE @ 20°C:** 3.7 mmHg

**EVAPORATION RATE (nBuAc = 1):** Not available.

**POUR POINT:** Not available.

**VAPOR DENSITY:** Not available.

## 10. STABILITY and REACTIVITY

**CHEMICAL STABILITY:** Stable under normal circumstances of use and handling. May become unstable if stabilizer becomes depleted. At high temperatures the diisocyanate components of this product can form carbodiimides with the release of carbon dioxide, which can cause pressure build up in closed containers.

**CONDITIONS TO AVOID:** Avoid contact with incompatible chemicals and exposure to extreme temperatures.

**INCOMPATIBLE MATERIALS:** Based on components, this product may be incompatible with amines, water, strong bases, alcohols, copper alloys, zinc, tin and aluminum compounds.

## 10. STABILITY and REACTIVITY (Continued)

**HAZARDOUS DECOMPOSITION PRODUCTS:** *Combustion:* Thermal decomposition of this product can generate formaldehyde, carbon, calcium, zirconium, titanium and nitrogen oxides, hydrogen cyanide, isocyanates and isocyanic acid. *Hydrolysis:* Carbon dioxide, heat and urea polymers.

**POSSIBILITY OF HAZARDOUS REACTIONS:** This product may undergo hazardous polymerization in contact with water or materials to which it is incompatible. The reaction may produce heat, carbon dioxide and urea polymers; reaction may be vigorous. Containers may rupture. Due to the high level of the Polyether Diol components, this product may form unstable or flammable peroxides on prolonged exposure to air if stabilizer is depleted.

## PART IV *Is there any other useful information about this material?*

### 11. TOXICOLOGICAL INFORMATION

**POTENTIAL HEALTH EFFECTS:** The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

**CONTACT WITH SKIN or EYES:** Depending on the duration of skin contact, skin overexposures can cause reddening, discomfort and moderate to severe irritation. Prolonged or further contact can cause severe inflammation, redness, rash, swelling and blistering. Repeated skin exposure to low concentration can cause dermatitis. Skin contact can cause allergic reaction. Brief contact with the liquid or vapors from this product and the eyes can cause irritation, reddening and watering. Direct eye contact may cause severe eye irritation. The trace Diphenylmethane 4,4'-Diisocyanate is a very strong sensitizing agent in humans, as well as the other diisocyanate components. Skin sensitization may occur after only one contact with. Brief contact with the liquid or vapors from this product and the eyes can cause irritation, reddening and watering. Permanent eye injury, including blindness, could result from direct contact with the liquid.

**SKIN ABSORPTION:** Prolonged skin contact may cause adverse systemic toxicity by skin absorption as described under ingestion or inhalation, as well as sensitization and allergic reaction to the skin.

**INGESTION:** If the product is swallowed, it can irritate the mouth, throat, and other tissues of the gastro-intestinal system or cause burns and may cause nausea, vomiting, and diarrhea. Symptoms can include dizziness, vomiting and incoordination. Ingestion of large amounts may be harmful and cause systemic toxicity. Aspiration into the lungs after ingestion can pose a serious hazard of chemical and pulmonary edema. Ingestion may be fatal.

**INHALATION:** Inhalation of vapors, mists, or sprays of this product can moderately to severely irritate the tissues of the nose, mouth, throat, and upper respiratory system. Symptoms of overexposure may include coughing, sneezing, and difficulty breathing. Severe overexposure via inhalation may result in a potentially fatal respiratory disorder (e.g., pulmonary edema, chemical pneumonitis); symptoms may be delayed by hours or even days. Inhalation of high concentrations of this product (as may occur in a poorly ventilated area) may be fatal. Repeated inhalation of mists of this product may cause respiratory disorders (e.g., bronchitis). Inhalation can also lead to adverse central nervous system effects, including dizziness, incoordination, nausea and vomiting. Chronic inhalation of low concentration may cause permanent damage to the lungs and reduced lung function. Effects such as euphoria, muscle incoordination and loss of consciousness have been reported after severe exposure to toluene diisocyanates. Inhalation can cause respiratory sensitization and allergic reaction as described further in this Section. Respiratory sensitization and lung damage may be permanent.

**INJECTION:** Accidental injection of this product (e.g. puncture with a contaminated object) may cause burning, redness, and swelling in addition to the wound.

**TARGET ORGANS:** *Acute:* Skin, eyes, respiratory system. *Chronic:* Skin, respiratory system, neurological system.

**TOXICITY DATA:** There are currently no toxicity data available for this product; the following toxicology data are available for components greater than 1% in concentration.

#### 1,4-BUTANEDIOL:

TDLo (Oral-Human) 10 mg/kg: Behavioral: sleep  
TDLo (Oral-Man) 42.8 mg/kg: Behavioral: convulsions or effect on seizure threshold, coma  
TDLo (Rectal-Man) 429 mg/kg  
TDLo (Unreported-Woman) 300 mg/kg: Behavioral: altered sleep time (including change in righting reflex)  
LD<sub>50</sub> (Oral-Rat) 1525 mg/kg  
LD<sub>50</sub> (Oral-Rat) 1525 mg/kg: Behavioral: altered sleep time (including change in righting reflex), somnolence (general depressed activity); Blood: other changes  
LD<sub>50</sub> (Oral-Mouse) 2062 mg/kg: Behavioral: altered sleep time (including change in righting reflex), somnolence (general depressed activity); Blood: other changes  
LD<sub>50</sub> (Oral-Mouse) 2062 mg/kg  
LD<sub>50</sub> (Oral-Rabbit) 2531 mg/kg  
LD<sub>50</sub> (Oral-Rabbit) 2531 mg/kg: Behavioral: altered sleep time (including change in righting reflex), somnolence (general depressed activity); Blood: other changes  
LD<sub>50</sub> (Oral-Guinea Pig) 1200 mg/kg  
LD<sub>50</sub> (Oral-Guinea Pig) 1200 mg/kg: Behavioral: altered sleep time (including change in righting reflex), somnolence (general depressed activity); Blood: other changes  
LD<sub>50</sub> (Intraperitoneal-Rat) 1070 mg/kg  
LD<sub>50</sub> (Intraperitoneal-Mouse) 1650 mg/kg  
TDLo (Oral-Rat) 500 mg/kg: Peripheral Nerve and Sensation: recording from peripheral motor nerve; Behavioral: ataxia; Vascular: other changes  
TDLo (Oral-Rat) 14 gm/kg/28 days-intermittent: Blood: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases, other transferases  
TDLo (Oral-Rat) 5460 mg/kg/26 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase; Metabolism (Intermediary): other carbohydrates  
TDLo (Oral-Mouse) 250 mg/kg: Lungs, Thorax, or Respiration: changes in pulmonary vascular resistance, respiratory depression; Gastrointestinal: other changes  
TDLo (Oral-Monkey) 56 mg/kg: Behavioral: food intake (animal), alteration of classical conditioning  
TDLo (Oral-Monkey) 180 mg/kg: Behavioral: tremor, ataxia; Gastrointestinal: nausea or vomiting  
TDLo (Oral-Monkey) 240 mg/kg: Behavioral: somnolence (general depressed activity), muscle weakness  
TDLo (Intraperitoneal-Rat) 32 mg/kg: Behavioral: changes in psychophysiological tests  
TDLo (Intraperitoneal-Rat) 178 mg/kg: Behavioral: alteration of operant conditioning  
TDLo (Intraperitoneal-Rat) 250 mg/kg: Behavioral: ataxia  
TDLo (Intraperitoneal-Rat) 36,960 mg/kg/6 weeks-intermittent: Behavioral: tolerance, alteration of operant conditioning

#### 1,4-BUTANEDIOL (continued):

TDLo (Intraperitoneal-Mouse) 73.3 mg/kg: Behavioral: ataxia  
TDLo (Intraperitoneal-Mouse) 163.9 mg/kg: Behavioral: muscle weakness  
TDLo (Intraperitoneal-Mouse) 177.6 mg/kg: Behavioral: changes in motor activity (specific assay)  
TDLo (Intraperitoneal-Mouse) 209.3 mg/kg: Behavioral: rigidity (including catalepsy)  
TDLo (Intraperitoneal-Mouse) 501.1 mg/kg: Behavioral: altered sleep time (including change in righting reflex)  
TDLo (Ocular-Mouse) 100 pph: Sense Organs and Special Senses (Eye): conjunctive irritation  
LDLo (Oral-Rat) 1000 mg/kg: Lungs, Thorax, or Respiration: changes in pulmonary vascular resistance; Kidney/Ureter/Bladder: changes in both tubules and glomeruli; Blood: hemorrhage  
LDLo (Oral-Rat) 2500 mg/kg: Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: respiratory depression  
LDLo (Oral-Mouse) 750 mg/kg: Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: respiratory depression  
LDLo (Intraperitoneal-Mouse) 500 mg/kg  
TCLo (Inhalation-Rat) 0.004 gm/m<sup>3</sup>/30 days-intermittent: Lungs, Thorax, or Respiration: emphysema, other changes  
TCLo (Inhalation-Rat) 0.4 gm/m<sup>3</sup>/122 days-intermittent: Vascular: structural changes in vessels; Lungs, Thorax, or Respiration: emphysema, changes in pulmonary vascular resistance  
TCLo (Inhalation-Rat) 1.75 gm/m<sup>3</sup>/3 weeks-intermittent: Behavioral: somnolence (general depressed activity)  
TCLo (Inhalation-Rat) 5200 mg/m<sup>3</sup>/6 hours/2 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol), changes in erythrocyte (RBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
TCLo (Inhalation-Mouse) 0.004 gm/m<sup>3</sup>/30 days-intermittent: Lungs, Thorax, or Respiration: emphysema, other changes  
TCLo (Inhalation-Mammal-Species Unspecified) 1500 mg/m<sup>3</sup>/4 hours/122 days-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)  
LCLo (Inhalation-Rat) 15 gm/m<sup>3</sup>/4 hours: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
**CALCIUM CARBONATE (NATURAL):**  
TDLo (Intravenous-Rat) 30 mg/kg: Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: changes in lung weight; Blood: other changes  
TCLo (Inhalation-Rat) 84 mg/m<sup>3</sup>/4 hours/40 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial); Liver: other changes; Kidney/Ureter/Bladder: other changes  
TCLo (Inhalation-Rat) 250 mg/m<sup>3</sup>/2 hours/24 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis)

# 11. TOXICOLOGICAL INFORMATION (Continued)

## TOXICITY DATA (continued):

### CRYSTALLINE SILICA CRISTOBALITE:

TCLo (Inhalation-Human) 16 mppcf/8 hours/17.9 years-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis); Lungs, cough, dyspnea  
TCLo (Inhalation-Mouse) 70 mg/m<sup>3</sup>/5 hours/12 days-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), fibrosis (interstitial), other changes  
TCLo (Inhalation-Mouse) 43 mg/m<sup>3</sup>/5 hours/9 days-intermittent: Lungs, Thorax, or Respiration: pleural effusion, other changes  
LDLo (Intratracheal-Rat) 200 mg/kg: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis)  
TDLo (Intratracheal-Rat) 10 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TDLo (Intratracheal-Rat) 20 mg/kg: Lungs, Thorax, or Respiration: fibrosis (interstitial); Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TDLo (Intratracheal-Rat) 90 mg/kg: Tumorigenic: carcinogenic by RTECS criteria; Blood: lymphoma, including Hodgkin's disease  
TD (Intratracheal-Rat) 100 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: lymphoma, including Hodgkin's disease

### CRYSTALLINE SILICA (QUARTZ):

TCLo (Inhalation-Human) 300 mg/m<sup>3</sup>/10 years-intermittent: Systemic effects  
TCLo (Inhalation-Human) 16 mppcf/8 hours/17.9 years-intermittent: Pulmonary system effects  
TCLo (Inhalation-Rat) 50 mg/m<sup>3</sup>/6 hours/71 weeks-intermittent: Carcinogenic effects  
TCLo (Inhalation-Rat) 80 mg/m<sup>3</sup>/26 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis); Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune  
TCLo (Inhalation-Rat) 108 mg/m<sup>3</sup>/6 hours/3 days-intermittent: Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases, Enzyme inhibition, induction, or change in blood or tissue levels: other oxidoreductases, Metabolism (Intermediary): other proteins  
TCLo (Inhalation-Rat) 58 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Endocrine: changes in thymus weight; Blood: changes in leukocyte (WBC) count  
TCLo (Inhalation-Mouse) 1475 µg/m<sup>3</sup>/8 hours/21 weeks-intermittent: Lungs, Thorax, or Respiration: other changes  
TCLo (Inhalation-Mouse) 4932 µg/m<sup>3</sup>/24 hours/39 weeks-continuous: Endocrine: changes in spleen weight; Immunological Including Allergic: decrease in humoral immune response  
TCLo (Inhalation-Guinea Pig) 28 mg/m<sup>3</sup>/3 weeks-continuous: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other  
TDLo (Intraperitoneal-Rat) 45 mg/kg: Carcinogenic effects  
TDLo (Intratracheal-Rat) 90 mg/kg: Equivocal tumorigenic agent  
TDLo (Intratracheal-Rat) 90 mg/kg: AR  
TDLo (Intratracheal-Rat) 111 mg/kg: Carcinogenic effects  
TDLo (Intratracheal-Rat) 111 mg/kg: AR  
TDLo (Intratracheal-Rat) 100 mg/kg/19 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors  
TDLo (Intratracheal-Rat) 90 mg/kg: Carcinogenic effects  
TDLo (Intratracheal-Hamster) 83 mg/kg: Tumorigenic: neoplastic by RTECS criteria, tumors at site of application  
TDLo (Implant-Rat) 900 mg/kg: Neoplastic effects  
TDLo (Implant-Mouse) 4000 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Kidney, Ureter, Bladder: tumors  
TDLo (Implant-Mouse) 4000 mg/kg: Equivocal tumorigenic agent  
TDLo (Intravenous-Rat) 90 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: lymphoma, including Hodgkin's disease  
TD (Intraperitoneal-Rat) 90 mg/kg/4 weeks-intermittent: Equivocal tumorigenic agent  
TD (Intraperitoneal-Rat) 450 mg/kg/4 weeks-intermittent: Neoplastic effects  
TD (Implant-Rat) 4554 mg/kg: Equivocal tumorigenic agent  
TD (Intratracheal-Rat) 200 mg/kg: Equivocal tumorigenic agent  
TD (Intratracheal-Rat) 100 mg/kg: Carcinogenic effects  
TD (Intratracheal-Rat) 100 mg/kg: Neoplastic effects  
TD (Intratracheal-Rat) 100 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), tumors  
LDLo (Intravenous-Rat) 90 mg/kg  
LDLo (Intratracheal-Rat) 200 mg/kg  
LDLo (Intravenous-Mouse) 40 mg/kg  
LDLo (Intravenous-Dog, adult) 20 mg/kg  
Micronucleus Test (Human-Lung) 40 µg/cm<sup>2</sup>  
Micronucleus Test (Hamster-Lung) 160 µg/cm<sup>2</sup>

### KAOLIN:

TCLo (Inhalation-Rat) 30 mg/m<sup>3</sup>/96 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), other changes, tumors  
TCLo (Inhalation-Rat) 9 mg/m<sup>3</sup>/96 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)  
TCLo (Inhalation-Rat) 30 mg/m<sup>3</sup>/72 weeks-intermittent: Lungs, Thorax, or Respiration: tumors  
TCLo (Inhalation-Rat) 30 mg/m<sup>3</sup>/48 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)  
TCLo (Inhalation-Rat) 30 mg/m<sup>3</sup>/96 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, tumors  
TCLo (Inhalation-Hamster) 30 mg/m<sup>3</sup>/72 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), other changes; Gastrointestinal: tumors  
TCLo (Inhalation-Hamster) 30 mg/m<sup>3</sup>/72 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), tumors  
TCLo (Inhalation-Hamster) 30 mg/m<sup>3</sup>/24 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, fibrosis (interstitial)  
TCLo (Inhalation-Hamster) 30 mg/m<sup>3</sup>/48 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), tumors  
TDLo (Oral-Rat) 370 gm/kg/37 days-intermittent: Blood: normocytic anemia, other changes, changes in erythrocyte (RBC) count  
TDLo (Oral-Rat) 590 gm/kg: female 37 day(s) pre-mating 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)  
TDLo (Oral-Rat) 370 gm/kg: female 37 day(s) pre-mating 1-22 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: other neonatal measures or effects

### POLYALKYLENE GLYCOL:

LD<sub>50</sub> (Oral-Rat) 5700 mg/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: hypermotility, diarrhea  
LD<sub>50</sub> (Oral-Mouse) 3 gm/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: hypermotility, diarrhea  
TDLo (Skin-Rat) 130 gm/kg/13 weeks-intermittent: Liver: changes in liver weight; Kidney/Ureter/Bladder: changes in bladder weight

### POLYETHER DIOL:

LD<sub>50</sub> (Oral-Rat) ~ 4000 mg/kg  
LD<sub>50</sub> (Skin-Rabbit) ~ 2000 mg/kg  
LC<sub>50</sub> (Inhalation-Rat) ~ 200 mg/L/1 hour

### PSEUDOCUMENE:

LD<sub>50</sub> (Oral-Rat) 5 gm/kg  
LD<sub>50</sub> (Oral-Mouse) 6900 mg/kg  
LD<sub>50</sub> (Intraperitoneal-Rat) 5 mL/kg: Lungs, Thorax, or Respiration: other changes; Vascular: regional or general arteriolar or venous dilation  
LC<sub>50</sub> (Inhalation-Rat) 18,000 mg/m<sup>3</sup>/4 hours  
LDLo (Intraperitoneal-Rat) 1752 mg/kg  
LDLo (Intraperitoneal-Guinea Pig) 1788 mg/kg  
LDLo (Intraperitoneal-Guinea Pig) 1.5 mL/kg  
TDLo (Oral-Rat) 10 gm/kg/4 weeks-intermittent: Related to Chronic Data: death  
TDLo (Oral-Rat) 6400 mg/kg/8 weeks-intermittent: Peripheral Nerve and Sensation: recording from afferent nerve; Peripheral Nerve and Sensation: recording from peripheral motor nerve; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
TDLo (Oral-Rat) 19,600 mg/kg/4 weeks-intermittent: Brain and Coverings: recordings from specific areas of CNS; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
TCLo (Inhalation-Rat) 20 mg/m<sup>3</sup>/24 hours/17 weeks-intermittent: Kidney/Ureter/Bladder: other changes in urine composition; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: catalyses  
TCLo (Inhalation-Rat) 100 ppm/6 hours/20 days-intermittent: Behavioral: changes in motor activity (specific assay), analgesia, alteration of operant conditioning  
TCLo (Inhalation-Rat) 20 mg/m<sup>3</sup>/16 weeks-continuous: Kidney/Ureter/Bladder: other changes in urine composition

Sister Chromatid Exchange (Intraperitoneal-Mouse) 900 mg/kg

### TALC:

Standard Draize Test (Skin-Human) 300 µg/3 days-intermittent: Mild  
TCLo (Inhalation-Rat) 17 mg/m<sup>3</sup>/6 hours/26 days-intermittent: Lungs, Thorax, or Respiration: other changes  
TCLo (Inhalation-Rat) 18 mg/m<sup>3</sup>/6 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: bronchiogenic carcinoma; Endocrine: tumors  
TCLo (Inhalation-Rat) 11 mg/m<sup>3</sup>/1 year-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors  
TCLo (Inhalation-Mouse) 20,400 µg/m<sup>3</sup>/6 hours/26 days-intermittent  
TITANIUM DIOXIDE:  
Standard Draize Test (Skin-Human) 300 µg/3 days-intermittent: Mild  
TC (Inhalation-Rat) 10 mg/m<sup>3</sup>/18 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors  
LD (Intratracheal-Rat) > 100 µg/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other Enzymes  
TD (Intramuscular-Rat) 260 mg/kg/84 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: lymphoma, including Hodgkin's disease; Tumorigenic: tumors at site of application  
TDLo (Oral-Rat) 60 gm/kg: Gastrointestinal: hypermotility, diarrhea, other changes  
TDLo (Intramuscular-Rat) 360 mg/kg/2 years-intermittent: Tumorigenic: neoplastic by RTECS criteria; Blood: lymphoma, including Hodgkin's disease; Tumorigenic: tumors at site of application

TDLo (Intratracheal-Rat) 1.25 mg/kg: Vascular: regional or general arteriolar constriction; Lungs, Thorax, or Respiration: other changes  
TDLo (Intratracheal-Rat) 1.6 mg/kg: Lungs, Thorax, or Respiration: other changes  
TDLo (Intratracheal-Rat) 5 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TDLo (Intratracheal-Mouse) 100 mg/kg: Tumorigenic: increased incidence of tumors in susceptible strains  
TCLo (Inhalation-Rat) 1 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TCLo (Inhalation-Rat) 250 mg/m<sup>3</sup>/6 hours/4 weeks-intermittent: Lungs, Thorax, or Respiration: chronic pulmonary edema, other changes  
TCLo (Inhalation-Rat) 50 mg/m<sup>3</sup>/6 hours/13 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi  
TCLo (Inhalation-Rat) 10 mg/m<sup>3</sup>/6 hours/13 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TCLo (Inhalation-Rat) 10 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TCLo (Inhalation-Rat) 50 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Blood: changes in cell count (unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases  
TCLo (Inhalation-Rat) 250 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Blood: changes in cell count (unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases  
TCLo (Inhalation-Rat) 274 mg/m<sup>3</sup>/5 days-intermittent: Lungs, Thorax, or Respiration: changes in lung weight; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: multiple enzyme effects, Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TCLo (Inhalation-Rat) 250 mg/m<sup>3</sup>/6 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors  
TCLo (Inhalation-Mouse) 10 mg/m<sup>3</sup>/6 hours/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation  
TCLo (Inhalation-Mouse) 10 mg/m<sup>3</sup>/6 hours/13 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

# 11. TOXICOLOGICAL INFORMATION (Continued)

## TOXICITY DATA (continued):

### TITANIUM DIOXIDE (continued):

TCLo (Inhalation-Mouse) 10 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Mouse) 50 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TCLo (Inhalation-Mouse) 250 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Blood: changes in cell count (unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TCLo (Inhalation-Hamster) 250 mg/m<sup>3</sup>/13 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Blood: changes in cell count (unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TCLo (Inhalation-Hamster) 250 mg/m<sup>3</sup>/6 hours/13 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

DNA Damage (Human Lung) 100 µg/plate

DNA Damage (Human Lung) 20 µg/disk/4 hours

Sister Chromatid Exchange (Human Lymphocyte) 2 µmol/L/72 hours

Micronucleus Test (Human Lymphocyte) 5 µmol/L/72 hours

Micronucleus Test (Intraperitoneal-Mouse) 3 gm/kg/3 days-continuous

Micronucleus Test (Hamster Ovary) 5 µmol/L

DNA Inhibition (Hamster Lung) 500 mg/L

Sister Chromatid Exchange (Hamster Ovary) 1 µmol/L

### 2,4-TOLUENE DIISOCYANATE:

Open Irritation Test (Skin-Rabbit) 500 mg: Severe

Standard Draize Test (Skin-Rabbit) 500 mg/24 hour: Moderate

Standard Draize Test (Eye-Rabbit) 100 mg: Severe

TCLo (Inhalation-Woman) 300 ppt/8 hours/5 days: Lungs, Thorax, or Respiration: respiratory obstruction

TCLo (Inhalation-Human) 20 ppb/2 years: Lungs, Thorax, or Respiration: cough, sputum

TCLo (Inhalation-Human) 500 ppb: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Human) 80 ppb: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes

LC<sub>50</sub> (Inhalation-Rat) 14 ppm/4 hours: Sense Organs and Special Senses (Eye): lachrymation; Behavioral: excitement; Lungs, Thorax, or Respiration: dyspnea

LC<sub>50</sub> (Inhalation-Rat) 14 ppm/4 hours

LC<sub>50</sub> (Inhalation-Mouse) 10 ppm/4 hours: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, changes in pulmonary vascular resistance

LC<sub>50</sub> (Inhalation-Mouse) 10 ppm/4 hours

LC<sub>50</sub> (Inhalation-Rabbit) 11 ppm/4 hours: Behavioral: excitement; Lungs, Thorax, or Respiration: dyspnea; Gastrointestinal: changes in structure or function of salivary glands

LD<sub>50</sub> (Oral-Rat) 6.17 gm/kg

LD<sub>50</sub> (Oral-Rat) 5800 mg/kg: Gastrointestinal: other changes

LD<sub>50</sub> (Oral-Wild Bird Species) 100 mg/kg

LD<sub>50</sub> (Skin-Rabbit) > 16 mL/kg

LD<sub>50</sub> (Intravenous-Mouse) 56 mg/kg

TCLo (Inhalation-Rat) 0.004 gm/m<sup>3</sup>/4 hours: Liver: hepatitis (hepatocellular necrosis), zonal

TCLo (Inhalation-Rat) 102 ppb/24 hours/7 days-continuous: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

TCLo (Inhalation-Rat) 204 µg/m<sup>3</sup>/24 hours/84 days-continuous: Behavioral: muscle contraction or spasticity; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase, Metabolism (Intermediary): lipids including transport

TCLo (Inhalation-Rat) 26 ppm/6 hours/5 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, chronic pulmonary edema; Related to Chronic Data: death

TCLo (Inhalation-Mouse) 990 ppb/6 hours/14 days-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

TCLo (Inhalation-Mouse) 1500 ppb/71 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi; Related to Chronic Data: death

TCLo (Inhalation-Rabbit) 1500 ppb/6 hours/79 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

TDLo (Oral-Rat) 15 gm/kg/10 days-intermittent: Gastrointestinal: other changes; Liver: other changes; Related to Chronic Data: death

### 2,4-TOLUENE DIISOCYANATE (continued):

TDLo (Skin-Mouse) 800 mg/kg/4 days-intermittent: Immunological Including Allergic: increased immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 15 mg/kg/3 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure); Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 240 mg/kg/28 days-intermittent: Immunological Including Allergic: increase in humoral immune response

TDLo (Skin-Mouse) 0.03 mL/kg/3 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

TDLo (Skin-Mouse) 1.8 µL/kg/3 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

TDLo (Skin-Mouse) 18 µL/kg/17 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

TDLo (Skin-Mouse) 18.2 µL/kg/31 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure); Immunological Including Allergic: increased immune response

TDLo (Skin-Mouse) 1.7 mg/kg/17 days-intermittent: Immunological Including Allergic: increase in cellular immune response, increase in humoral immune response

TDLo (Skin-Mouse) 90 mg/kg/3 days-intermittent: Immunological Including Allergic: increase in humoral immune response; Biochemical: Metabolism (Intermediary): other proteins, effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 7.2 mg/kg/6 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

TDLo (Skin-Mouse) 4.8 mg/kg/8 days-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 1 pph/3 days-intermittent: Immunological Including Allergic: increased immune response; Biochemical: Metabolism (Intermediary): other proteins, effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 90 mg/kg/3 days-intermittent: Skin and Appendages: dermatitis, allergic (after topical exposure); Biochemical: Metabolism (Intermediary): other proteins, effect on inflammation or mediation of inflammation

TDLo (Multiple Routes-Mouse) 0.3 pph/3 days-intermittent: Lungs, Thorax, or Respiration: bronchiolar constriction; Lungs, Thorax, or Respiration: acute pulmonary edema, changes in lung weight

TDLo (Intradermal-Mouse) 500 mg/kg/3 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

TDLo (Intratracheal-Rat) 48.84 µL/kg/21 days-intermittent: Immunological Including Allergic: other immediate (humoral): urticaria, allergic rhinitis, serum sickness; Biochemical: Metabolism (Intermediary): histamines (including liberation not immunochemical in origin)

Mutation in Microorganisms (Bacteria-Salmonella typhimurium) 100 µg/plate

Mutation in Microorganisms (Bacteria-Salmonella typhimurium) 0.033 mg/plate

Specific Locus Test (Mouse Lymphocyte) 75 mg/L

Sister Chromatid Exchange (Hamster Ovary) 300 mg/L

Micronucleus Test (Inhalation-Rat) 0.05 ppm/6 hours/4 weeks

Morphological Transformation (Mouse Fibroblast) 0.2 mg/L/21 days

### 2,6-TOLUENE DIISOCYANATE:

TCLo (Inhalation-Human) 50 ppb: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes

LD<sub>50</sub> (Oral-Wild Bird Species) 100 mg/kg

TCLo (Inhalation-Mouse) 7.5 mg/m<sup>3</sup>/3 days-intermittent: Immunological Including Allergic: increased immune response; Biochemical: Metabolism (Intermediary): other proteins, effect on inflammation or mediation of inflammation

Mutation in Microorganisms (Bacteria-Salmonella typhimurium) 10 µg/plate

Mutation in Microorganisms (Bacteria-Salmonella typhimurium) 300 µg/plate

Specific Locus Test (Mouse Lymphocyte) 25 mg/L

Cytogenetic Analysis (Hamster Ovary) 600 mg/L

Sister Chromatid Exchange (Hamster Ovary) 300 mg/L

Morphological Transformation (Mouse Fibroblast) 20 mg/L/21 days

**CARCINOGENIC POTENTIAL:** The following table summarizes the carcinogenicity listing for the components of this product. "NO" indicates that the substance is not considered to be or suspected to be a carcinogen by the listed agency, see section 16 for definitions of other ratings.

CHEMICAL	IARC	EPA	NTP	NIOSH	ACGIH	OSHA	PROP 65
Crystalline Silica/Quartz & Crystobalite	1	No	K (respirable fraction)	Ca	A2	No	Yes (airborne unbound particles of respirable size)
1,4-Butanediol	No	No	No	No	No	No	No
Kaolin	No	No	No	No	A4	No	No
Limestone/Calcium Carbonate	No	No	No	No	No	No	No
Mica	No	No	No	No	No	No	No
Naphtha Petroleum Hydrotreated Light	3	No	No	No	No	No	No
Polyether Diol	No	No	No	No	No	No	No
Pseudocumene	No	No	No	No	No	No	No
Talc	3	No	No	No	A4	No	No
Titanium Dioxide	2B	No	No	Ca	A4	No	Yes (airborne unbound particles of respirable size)
Toluene 2,4 & 2,6-Diisocyanates	2B	No	No	Ca	A4 (NIC: A3)	No	Toluene Diisocyanate Mixture (CAS# 26471-62-5)

IARC-1: Carcinogenic to Humans. IARC-2B: Possibly Carcinogenic to Humans. IARC-3: Possibly Carcinogenic to Humans. NTP-R: Reasonable Anticipated to Be a Human Carcinogen. NTP-K: Known to Be a Human Carcinogen. NIOSH-Ca: Potential Occupational Carcinogen, with No Further Categorization. ACGIH TLV-A2: Suspected Human Carcinogen. ACGIH TLV-A3: Confirmed Animal Carcinogen with Unknown Relevance to Humans. ACGIH TLV-A4: Not Classifiable as a Human Carcinogen.



## 11. TOXICOLOGICAL INFORMATION (Continued)

**IRRITANCY OF PRODUCT:** This product is irritating by all routes of exposure.

**SENSITIZATION TO THE PRODUCT:** This product contains diisocyanate compounds, which are known human skin and respiratory sensitizers. Exposure can cause allergic reactions. Cross-sensitization between different isocyanates may occur. Skin sensitization may occur after only a few days working with products containing 4,4'-Diphenylmethane Diisocyanate. Onset of symptoms is usually delayed. Symptoms include a rash on the hands, arms, neck, face, chest or abdomen, even when contact occurs with a small amount of product. Other effects such as coughing, a burning sensation in the throat or redness and swelling of the eyes might also occur.

**Respiratory Sensitization:** Initial symptoms of respiratory reactions may appear to be a cold or mild hay fever. However, severe asthmatic symptoms can develop and include wheezing, chest tightness, shortness of breath, difficulty breathing and/or coughing. Fever, chills, general feelings of discomfort, headache, and fatigue can also occur. Symptoms may occur immediately upon exposure (within an hour), several hours after exposure or both, and/or at night. Typically, the asthma improves with removal from exposure (e.g. weekends or vacations) and returns, in some cases, in the form of an "acute attack", on renewed exposure. Sensitized people who continue to work with diisocyanates may develop symptoms sooner after each exposure. The number and severity of symptoms may increase. Death has occurred in sensitized individuals accidentally exposed to relatively low concentrations of some diisocyanates. Following removal from exposure, some sensitized workers may continue to show a slow decline in lung function and have persistent respiratory problems such as asthmatic symptoms, chronic bronchitis and hypersensitivity for months or years. Exposure to isocyanates is likely to aggravate existing respiratory disease, such as chronic bronchitis, and emphysema.

**Skin Sensitization:** Repeated skin contact with diisocyanates has caused skin sensitization in humans, although the condition is not common. Once a person is sensitized, contact with even a small amount can cause outbreaks of dermatitis with symptoms such as redness, rash, itching and swelling. This can spread from the hands or arms to the face and body. Some people who have inhaled some diisocyanates developed extensive skin rashes can last weeks.

**TOXICOLOGICAL SYNERGISTIC PRODUCTS:** None known.

**REPRODUCTIVE TOXICITY INFORMATION:** This product has not been tested for reproductive toxicity.

**Mutagenicity:** Based on potential benzene content, the Naphtha Petroleum Hydrotreated Light component is assumed to have mutagenic properties. No specific data was found.

**Embryotoxicity/Teratogenicity:** No birth defects were seen in two independent animal (rat) studies involving the Diphenylmethane 4,4'-Diisocyanate compound. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations well in excess of the defined occupational limits. Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.

**BIOLOGICAL EXPOSURES INDICES (BEIs):** Currently, there are no BEI's established for components of this product.

## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

**MOBILITY:** This product has not been tested for mobility in soil. The following information is available for the toluene diisocyanate components.

**2,4-TOLUENE DIISOCYANATE:** 2,4-Toluene Diisocyanate hydrolyzes rapidly in aqueous solution; therefore, leaching and adsorption to sediment will not be environmentally important.

**2,6-TOLUENE DIISOCYANATE:** 2,6-Toluene Diisocyanate reacts readily with water; therefore, leaching of 2,6-toluene diisocyanate in soil should not be important.

**PERSISTENCE AND BIODEGRADABILITY:** This product has not been tested for persistence or biodegradability. The following information is available for the toluene diisocyanate components.

**2,4-TOLUENE DIISOCYANATE:** If released to air, a vapor pressure of 8X10<sup>-3</sup> mm Hg at 25°C indicates 2,4-toluene Diisocyanate will exist solely as a vapor in the ambient atmosphere. Vapor-phase 2,4-toluene Diisocyanate will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 1.7 days. Atmospheric degradation may also occur through contact with clouds, fog or rain. If released to water or moist soil, 2,4-toluene Diisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. 2,4-Toluene Diisocyanate is not expected to volatilize from dry soil surfaces based upon its vapor pressure. If spilled on wet land, TDI is rapidly degraded. If released into water, a crust forms around the liquid TDI and <0.5% of the original material remains after 35 days. Low concentrations of TDI hydrolyze in the aqueous environment in approximately a day.

**2,6-TOLUENE DIISOCYANATE:** If released to air, a vapor pressure of 0.02 mm Hg at 25°C indicates 2,6-Toluene Diisocyanate will exist solely as a vapor in the ambient atmosphere. Vapor-phase 2,6-Toluene Diisocyanate will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 2.5 days. Atmospheric degradation may also occur through contact with clouds, fog or rain. If released to moist soil, 2,6-Toluene Diisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. In one experiment simulating a spill, 5.5% of the original material remained after 24 hours and in a field situation; the concentration of TDI had declined to the ppm level in 12 weeks. If released to water, 2,6-Toluene Diisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. If released into water in a spill situation, a crust forms around the liquid TDI mixture and <0.5% of the original material remains after 35 days. Low concentrations of TDI hydrolyze in the aqueous environment in approximately a day.

**BIO-ACCUMULATION POTENTIAL:** This product has not been tested for bio-accumulation potential. The following information is available for the toluene diisocyanate components.

**2,4-TOLUENE DIISOCYANATE:** 2,4-Toluene Diisocyanate hydrolyzes rapidly in aqueous solution; therefore, bioconcentration will not be environmentally important.

**2,6-TOLUENE DIISOCYANATE:** 2,6-Toluene Diisocyanate decomposes in water; therefore, bioconcentration in aquatic organisms is not expected to be an important environmental fate process.

**ECOTOXICITY:** This product has not been tested for aquatic or animal toxicity. The following aquatic toxicity data are available for the toluene diisocyanate components.

### 2,4-TOLUENE DIISOCYANATE:

LC<sub>50</sub> (fathead minnow) 24 hours = 194.9 mg/L

LC<sub>50</sub> (fathead minnow) 48 hours = 172.1 mg/L

LC<sub>50</sub> (fathead minnow) 96 hours = 164.5 mg/L

TLm (fathead minnow) 96 hours = 10-1 ppm (est.)

### 2,6-TOLUENE DIISOCYANATE:

LC<sub>50</sub> (*Pimephales promelas* fathead minnow) 24 hours = 195 mg/L/Conditions of bioassay not specified

### 2,6-TOLUENE DIISOCYANATE (continued):

LC<sub>50</sub> (*Pimephales promelas* fathead minnow) 48 hours = 172 mg/L/Conditions of bioassay not specified

LC<sub>50</sub> (*Pimephales promelas* fathead minnow) 96 hours = 164 mg/L/Conditions of bioassay not specified

No Significant Mortality Below (*Palaemonetes pugio* grass shrimp) 508 mg/L/Conditions of bioassay not specified

**OTHER ADVERSE EFFECTS:** This material is not expected to have any ozone depletion potential.

**ENVIRONMENTAL EXPOSURE CONTROLS:** Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** As supplied, this product would be a hazardous waste as defined by U.S. federal regulation (40 CFR 261) if discarded or disposed. It has the characteristic of Ignitibility. State and local regulations may differ from federal regulations. The generator of the waste is responsible for proper waste determination and management.

**U.S. EPA WASTE NUMBER:** D001.

## 14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: This product is classified as Dangerous Goods, per U.S. DOT regulations, under 49 CFR 172.101.

**UN IDENTIFICATION NUMBER:** UN 1263  
**PROPER SHIPPING NAME:** Paint, flammable liquid  
**HAZARD CLASS NUMBER and DESCRIPTION:** 3 (Flammable)  
**PACKING GROUP:** PG III  
**DOT LABEL(S) REQUIRED:** Class 3 (Flammable)  
**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2012):** 127  
**MARINE POLLUTANT:** The components of this product are not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101).

**Note: If non bulk packages (119 gallons or less) are shipped by ground domestically, this product is not regulated under DOT's Hazardous Material Regulations so non-bulk packages of it ship via ground domestically as a non-hazardous material.**

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is classified as Dangerous Goods, per regulations of Transport Canada.

**UN IDENTIFICATION NUMBER:** UN 1263  
**PROPER SHIPPING NAME:** Paint, flammable liquid  
**HAZARD CLASS NUMBER and DESCRIPTION:** 3 (Flammable)  
**PACKING GROUP:** PG III  
**HAZARD SHIPPING LABEL(S) REQUIRED:** Class 3 (Flammable)  
**SPECIAL PROVISIONS:** 59, 83  
**EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:** 5  
**ERAP INDEX:** None  
**PASSENGER CARRYING SHIP INDEX:** None  
**PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:** 60

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is classified as dangerous goods, per the International Air Transport Association.

**UN IDENTIFICATION NUMBER:** UN 1263  
**PROPER SHIPPING NAME:** Paint, flammable liquid  
**HAZARD CLASS or DIVISION:** 3 (Flammable)  
**HAZARD LABEL(S) REQUIRED:** Class 3 (Flammable)  
**PACKING GROUP:** III  
**EXCEPTED QUANTITIES:** E1  
**PASSENGER and CARGO AIRCRAFT PACKING INSTRUCTION:** 355  
**PASSENGER and CARGO AIRCRAFT MAXIMUM NET QUANTITY PER PKG:** 10 L  
**PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY PACKING INSTRUCTION:** Y344  
**PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY MAXIMUM NET QUANTITY PER PKG:** 60 L  
**CARGO AIRCRAFT ONLY PACKING INSTRUCTION:** 364  
**CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY PER PKG:** 220 L  
**SPECIAL PROVISIONS:** A3, A72  
**ERG CODE:** 3L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is classified as dangerous goods, per the International Maritime Organization.

**UN No.:** 1263  
**PROPER SHIPPING NAME:** Paint, flammable liquid  
**HAZARD CLASS NUMBER:** 3 (Flammable)  
**LABELS:** Class 3 (Flammable)  
**PACKING GROUP:** III  
**SPECIAL PROVISIONS:** 163, 223, 955  
**LIMITED QUANTITIES:** 5 L  
**EXCEPTED QUANTITIES:** E1  
**PACKING:** Instructions: P001, LP01; Provisions: PP1  
**IBCs:** Instructions: IBC03; Provisions: None  
**TANKS:** Instructions: T2; Provisions: T1, TP29  
**EmS:** F-E, S-E  
**STOWAGE CATEGORY:** Category A.  
**MARINE POLLUTANT:** No component of this product is designated by the IMO to be a Marine Pollutant.

## 15. REGULATORY INFORMATION

### ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The following components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

CHEMICAL	SECTION 302 EHS (TPQ) (40 CFR 355, Appendix A)	SECTION 304 RQ (40 CFR Table 302.4)	SECTION 313 TRI (threshold) (40 CFR 372.65)
Polymeric Diphenylmethane Diisocyanate	No	No	Yes ( Code N120)
Pseudocumene	No	No	Yes
2,4-Toluene Diisocyanate	Yes	Yes	Yes
2,6-Toluene Diisocyanate	Yes	Yes	Yes

U.S. SARA 302 EXTREMELY HAZARDOUS THRESHOLD PLANNING QUANTITY (TPQ): 2,4-Toluene Diisocyanate: 500 lb (227 kg); 2,6-Toluene Diisocyanate: 100 lb (454 kg)

U.S. SARA 304 EXTREMELY HAZARDOUS REPORTABLE QUANTITY (RQ): 2,4-Toluene Diisocyanate: 100 lb (454 kg); 2,6-Toluene Diisocyanate: 100 lb (454 kg)

## 15. REGULATORY INFORMATION (Continued)

### ADDITIONAL U.S. REGULATIONS (continued):

- kg)  
U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: Yes; SUDDEN RELEASE: No  
U.S. CERCLA REPORTABLE QUANTITY (RQ): ,4'-Diphenylmethane Diisocyanate = 5000 lb (2270 kg); 2,4-Toluene Diisocyanate = 100 lb (45.4 kg); 2,6-Toluene Diisocyanate = 100 lb (45.4 kg). The Polymeric Diphenylmethane Diisocyanate component is a CERCLA Hazardous Substance, although no specific CERCLA RQ has been defined.  
U.S. TSCA INVENTORY STATUS: All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.  
U.S. CLEAN AIR ACT (CA 112r) THRESHOLD QUANTITY (TQ): 2,4-Toluene Diisocyanate = 10,000 lb (4540 kg); 2,6-Toluene Diisocyanate = 10,000 lb (4540 kg). Although the Diphenylmethane 4,4-Diisocyanate compound has no TQ, it is listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems under the Clean Air Act.  
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product contains Crystalline Silica, a compound known to the State of California to Cause Cancer. It also contains Titanium Dioxide, a suspect carcinogen which is also on the list. WARNING! Due to the form of the product, the Proposition 65 warning is not applicable to these compounds in this product.

### ADDITIONAL CANADIAN REGULATIONS:

- CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL Inventory.  
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: Not applicable.  
CANADIAN WHMIS REGULATIONS: This product is classified as a Controlled Product, Hazard Classes, B2 (Flammable Liquid); D1A/D2A (Poisonous and Infectious Material, Other Effects/Very Toxic: Inhalation Toxicity, Teratogenicity and Embryotoxicity), D2B (Poisonous and Infectious Material, Other effects/Toxic: Skin Irritation) as per the Controlled Product Regulations.



### ADDITIONAL MEXICAN REGULATIONS:

- MEXICAN WORKPLACE REGULATIONS (NOM-018-STPS-2000): This product is classified as hazardous.

## 16. OTHER INFORMATION

U.S. ANSI STANDARD LABELING (Precautionary Statements): DANGER! FLAMMABLE LIQUID. TOXIC BY INHALATION. MAY CAUSE EYE, SKIN AND RESPIRATORY IRRITATION. CAN CAUSE SKIN AND RESPIRATORY SENSITIZATION AND ALLERGIC REACTION. CONTAINS COMPOUNDS THAT ARE SUSPECT CARCINOGENS. COMBUSTIBLE LIQUID. CONTAINS COMPOUNDS THAT CAN CAUSE HARM TO AQUATIC ORGANISMS. Avoid contact with eyes, skin, and clothing. Avoid breathing mist, vapors or fume. Do not taste or swallow. Wash thoroughly after handling. Keep container tightly closed. Use only with adequate ventilation. Keep away from heat and flame. Wear gloves, eye protection, respiratory protection, and appropriate body protection. FIRST-AID: In case of contact, immediately flush skin and eyes with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, do not induce vomiting. Get medical attention. IN CASE OF FIRE: Use water fog, foam, dry chemical, or CO<sub>2</sub>. IN CASE OF SPILL: Absorb spilled product with polypads or other suitable absorbing material. Place all spill residue in an appropriate container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada.

### GLOBAL HARMONIZATION SYSTEM CLASSIFICATION:

Classification: Flammable Liquid Category 3, Carcinogenic Category 2, Germ Cell Mutagenic Category 2, Acute Inhalation Toxicity Category 2, Skin Irritation Category 2, Eye Irritation Category 2, STOT (Inhalation-Respiratory Irritation) Single Exposure Category 3, Respiratory Sensitizer Category 1, Skin Sensitization Category 1, Aquatic Chronic Toxicity Category 3

Signal Word: Danger

Hazard Statements: H226: Flammable liquid and vapor. H351: Suspected of causing cancer. H341: Suspected of causing genetic effects. H331: Toxic if inhaled. H315: Causes skin irritation. H319: Causes serious eye irritation. H317: May cause an allergic skin reaction. H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H335: May cause respiratory irritation. H412: Harmful to aquatic life with long-lasting effects.

### Precautionary Statements:

Prevention: P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P260: Do not breathe mist/vapors/spray. P210: Keep away from heat/sparks/open flames/hot surfaces. — No smoking. P233: Keep container tightly closed. P240: Ground/bond container and receiving equipment. P241: Use explosion-proof electrical/ventilating/lighting/equipment. P242: Use only non-sparking tools. P243: Take precautionary measures against static discharge. P264: Wash contaminated tissues after handling. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in a well-ventilated area. P272: Contaminated work clothing should not be allowed out of the workplace. P273: Avoid release to the environment. P280: Wear protective gloves, clothing, eye protection and face protection. P284: Wear respiratory protection.

Response: P308 + P313: IF exposed or concerned: Get medical advice/attention. P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P370 + P378: In case of fire: Use materials appropriate for surrounding fire for extinction. P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P342 + P311: If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: get medical advice/attention. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms).

Storage: P403 + P233 + P235: Store in a well-ventilated place. Keep container tightly closed. Keep cool. P405: Store locked up.

Disposal: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

## 16. OTHER INFORMATION (continued)

Hazard Symbols/Pictograms: GHS02, GHS06, GHS08

### DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information presented in this Material Safety Data Sheet is presented in good faith based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. In no case shall the descriptions, information, data or designs provided be considered a part of our terms and conditions of sale.

All materials may present hazards and should be used with caution. Because many factors may affect processing or application/use, we recommend that you make tests to determine the suitability of a product for your particular purpose prior to use. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices or applicable federal, state, or local laws or regulations. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

REFERENCES AND DATA SOURCES: Contact the supplier for information.

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.

REVISION DETAILS: New.

DATE OF PRINTING

November 22, 2013

### DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a SDS. Some of these, which are commonly used, include the following:

#### KEY ACRONYMS:

**CHEMTREC:** Chemical Transportation Emergency Center, a 24-hour emergency information and/or emergency assistance to emergency responders.

**CEILING LEVEL:** The concentration that shall not be exceeded during any part of the working exposure.

**DFG MAKs:** Federal Republic of Germany Maximum Concentration Values in the workplace. Exposure limits are given as TWA (Time-Weighted Average) or PEAK (short-term exposure) values.

**DFG MAK Germ Cell Mutagen Categories:** **1:** Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances that have been shown to induce genetic damage in germ cells of human or animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances that are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are *in vivo* data, but that are clearly mutagenic *in vitro* and structurally related to known *in vivo* mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

**DFG MAK Pregnancy Risk Group Classification: Group A:** A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed.

**DFG MAK Pregnancy Risk Group Classification (continued): Group D:** Classification in one of the groups A–C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

**IDLH:** Immediately Dangerous to Life and Health. This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

**LOQ:** Limit of Quantitation.

**NE:** Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

**NIC:** Notice of Intended Change.

**NIOSH CEILING:** The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

**NIOSH RELs:** NIOSH's Recommended Exposure Limits.

**PEL:** OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL" is placed next to the PEL that was vacated by Court Order.

**SKIN:** Used when there is a danger of cutaneous absorption.

**STEL:** Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that shall not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

**TLV:** Threshold Limit Value. An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

**TWA:** Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

**WEEL:** Workplace Environmental Exposure Limits from the AIHA.

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:** This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

**HEALTH HAZARD: 0 Minimal Hazard:** No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. Mechanical irritation may occur. PII or Draize = 0. *Eye Irritation:* Essentially non-irritating, minimal effects clearing in < 24 hours. Mechanical irritation may occur. Draize = 0. *Oral Toxicity LD<sub>50</sub> Rat:* > 5000 mg/kg. *Dermal Toxicity LD<sub>50</sub> Rat or Rabbit:* > 2000 mg/kg. *Inhalation Toxicity 4-hrs LC<sub>50</sub> Rat:* > 20 mg/L. **1 Slight Hazard:** Minor reversible injury may occur; may irritate the stomach if swallowed; may defat the skin and exacerbate existing dermatitis. *Skin Irritation:* Slightly or mildly irritating. PII or Draize > 0 < 5. *Eye Irritation:* Slightly to mildly irritating, but reversible within 7 days. Draize > 0 < 25. *Oral Toxicity LD<sub>50</sub> Rat:* > 500–5000 mg/kg. *Dermal Toxicity LD<sub>50</sub> Rat or Rabbit:* > 1000–2000 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 2–20 mg/L. **2 Moderate Hazard:** Temporary or transitory injury may occur; prolonged exposure may affect the CNS. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize ≥ 5, with no destruction of dermal tissue. *Eye Irritation:* Moderately to severely irritating; reversible corneal opacity; corneal involvement or irritation clearing in 8–21 days. Draize = 26–100, with reversible effects. *Oral Toxicity LD<sub>50</sub> Rat:* > 50–500 mg/kg. *Dermal Toxicity LD<sub>50</sub> Rat or Rabbit:* > 200–1000 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 0.5–2 mg/L. **3 Serious Hazard:** Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may cause destruction of

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):** dermal tissue, skin burns, and dermal necrosis. PII or Draize > 5–8, with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD<sub>50</sub> Rat:* > 1–50 mg/kg. *Dermal Toxicity LD<sub>50</sub> Rat or Rabbit:* > 20–200 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 0.05–0.5 mg/L. **4 Severe Hazard:** Life-threatening; major or permanent damage may result from single or repeated exposures; extremely toxic; irreversible injury may result from brief contact. *Skin Irritation:* Not appropriate. Do not rate as a 4, based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a 4, based on eye irritation alone. *Oral Toxicity LD<sub>50</sub> Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD<sub>50</sub> Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* ≤ 0.05 mg/L.

**FLAMMABILITY HAZARD: 0 Minimal Hazard:** Materials that will not burn in air when exposure to a temperature of 815.5°C (1500°F) for a period of 5 minutes. **1 Slight Hazard:** Materials that must be pre-heated before ignition can occur. Material requires considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur. This usually includes the following: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C (200°F) (i.e. OSHA Class IIIB); and Most ordinary combustible materials (e.g. wood, paper, etc.).

**FLAMMABILITY HAZARD (continued): 2 Moderate Hazard:** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres with air. This usually includes the following: Liquids having a flash-point at or above 37.8°C (100°F); Solid materials in the form of coarse dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp); and Solids and semisolids (e.g. viscous and slow flowing as asphalt) that readily give off flammable vapors. **3 Serious Hazard:** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions. This usually includes the following: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 38°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (100°F) (i.e. OSHA Class IB and IC); Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air (e.g., dusts of combustible solids, mists or droplets of flammable liquids); and Materials that burn extremely rapidly, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). **4 Severe Hazard:** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and that will burn readily. This usually includes the following: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. OSHA Class IA); and Materials that ignite spontaneously when exposed to air at a temperature of 54.4°C (130°F) or below (pyrophoric).

**PHYSICAL HAZARD: 0 Water Reactivity:** Materials that do not react with water. *Organic Peroxides:* Materials that are normally stable, even under fire conditions and will not react with water. *Explosives:* Substances that are Non-Explosive. *Compressed Gases:* No Rating. *Pyrophorics:* No Rating. *Oxidizers:* No 0 rating. *Unstable Reactives:* Substances that will not polymerize, decompose, condense, or self-react. **1 Water Reactivity:** Materials that change or decompose upon exposure to moisture. *Organic Peroxides:* Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy violently. *Explosives:* Division 1.5 & 1.6 explosives. Substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases:* Pressure below OSHA definition. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group III oxidizers; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives:* Substances that may decompose, condense, or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosion hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors. **2 Water Reactivity:** Materials that may react violently with water. *Organic Peroxides:* Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives:* Division 1.4 explosives. Explosive substances where the explosive effects are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases:* Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packing Group II oxidizers. Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Reactives:* Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential (or low risk) for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature. **3 Water Reactivity:** Materials that may form explosive reactions with water. *Organic Peroxides:* Materials that are capable of detonation or explosive reaction, but require a strong initiating source or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives:* Division 1.3 explosives. Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass

## DEFINITIONS OF TERMS (Continued)

### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

**explosion hazard. Compressed Gases:** Pressure  $\geq$  514.7 psi absolute at 21.1°C (70°F) [500 psig]. **Pyrophorics:** No Rating. **Oxidizers:** Packing Group I oxidizers. **Solids:** any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. **Liquids:** any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%) / cellulose mixture. **Unstable Reactives:** Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure and have a moderate potential (or moderate risk) to cause significant heat generation or explosion. **4 Water Reactivity:** Materials that react explosively with water without requiring heat or confinement. **Organic Peroxides:** Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. **Explosives:** Division 1.1 & 1.2 explosives. Explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. **Compressed Gases:** No Rating. **Pyrophorics:** Add to the definition of Flammability 4. **Oxidizers:** No 4 rating. **Unstable Reactives:** Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure and have a high potential (or high risk) to cause significant heat generation or explosion. **Pyrophorics:** Add to the definition of Flammability 4. **Oxidizers:** No 4 rating. **Unstable Reactives:** Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure and have a high potential (or high risk) to cause significant heat generation or explosion.

### NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

**HEALTH HAZARD: 0** Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials. Gases and vapors with an LC<sub>50</sub> for acute inhalation toxicity greater than 10,000 ppm. Dusts and mists with an LC<sub>50</sub> for acute inhalation toxicity greater than 200 mg/L. Materials with an LD<sub>50</sub> for acute dermal toxicity greater than 2000 mg/kg. Materials with an LD<sub>50</sub> for acute oral toxicity greater than 2000 mg/kg. Materials essentially non-irritating to the respiratory tract, eyes, and skin. **1** Materials that, under emergency conditions, can cause significant irritation. Gases and vapors with an LC<sub>50</sub> for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists with an LC<sub>50</sub> for acute inhalation toxicity greater than 10 mg/L but less than or equal to 200 mg/L.

**HEALTH HAZARD (continued): 1 (continued):** Materials with an LD<sub>50</sub> for acute dermal toxicity greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials that slightly to moderately irritate the respiratory tract, eyes and skin. Materials with an LD<sub>50</sub> for acute oral toxicity greater than 500 mg/kg but less than or equal to 2000 mg/kg. **2** Materials that, under emergency conditions, can cause temporary incapacitation or residual injury. Gases with an LC<sub>50</sub> for acute inhalation toxicity greater than 3,000 ppm but less than or equal to 5,000 ppm. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC<sub>50</sub> for acute inhalation toxicity, if its LC<sub>50</sub> is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Dusts and mists with an LC<sub>50</sub> for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LD<sub>50</sub> for acute dermal toxicity greater than 200 mg/kg but less than or equal to 1000 mg/kg. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. Materials whose LD<sub>50</sub> for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. **3** Materials that, under emergency conditions, can cause serious or permanent injury. Gases with an LC<sub>50</sub> for acute inhalation toxicity greater than 1,000 ppm but less than or equal to 3,000 ppm. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater its LC<sub>50</sub> for acute inhalation toxicity, if its LC<sub>50</sub> is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Dusts and mists with an LC<sub>50</sub> for acute inhalation toxicity greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials with an LD<sub>50</sub> for acute dermal toxicity greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials corrosive to the skin. Cryogenic gases that cause frostbite and irreversible tissue damage. Compressed liquefied gases with boiling points below -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials with an LD<sub>50</sub> for acute oral toxicity greater than 5 mg/kg but less than or equal to 50 mg/kg. **4** Materials that, under emergency conditions, can be lethal. Gases with an LC<sub>50</sub> for acute inhalation toxicity less than or equal to 1,000 ppm. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than ten times its LC<sub>50</sub> for acute inhalation toxicity, if its LC<sub>50</sub> is less than or equal to 1000 ppm. Dusts and mists whose LC<sub>50</sub> for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD<sub>50</sub> for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD<sub>50</sub> for acute oral toxicity is less than or equal to 5 mg/kg.

**FLAMMABILITY HAZARD: 0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D of NFPA 704. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D of NFPA 704. **Liquids, solids, and semisolids** having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). **Liquids** with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the UN *Recommendations on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). **Liquids** with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85% by weight. **Liquids** that have no fire point when tested by ASTM D 92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup*, up to the boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. **Combustible pellets** with a representative diameter of greater than 2 mm (10 mesh). Most ordinary combustible materials. **Solids** containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air. **Liquids** having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) **Solid materials** in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures with air. **Solid materials** in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal, and hemp. **Solids** and semisolids that readily give off flammable vapors. **Solids** containing greater than 0.5% by weight of a flammable

### NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS

**(continued)** or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. **Liquids** having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air. **Flammable or combustible dusts** with representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). **Solids** containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily. **Flammable gases.** **Flammable cryogenic materials.** Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, **Solids** containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

**INSTABILITY HAZARD: 0** Materials that in themselves are normally stable, even under fire conditions. Materials that have an instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures. Materials that have an instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures. Materials that have an instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100 W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation. Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures. Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater.

### FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **Flash Point:** Minimum temperature at which a liquid gives off sufficient vapor to form an ignitable mixture with air near the surface of the liquid or within the test vessel used. **Autoignition Temperature:** Minimum temperature of a solid, liquid, or gas required to initiate or cause self-sustained combustion in air with no other source of ignition. **LEL:** Lowest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame. **UEL:** Highest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame.

### TOXICOLOGICAL INFORMATION:

**Human and Animal Toxicology:** Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. **LD<sub>50</sub>:** Lethal Dose (solids & liquids) that kills 50% of the exposed animals. **LC<sub>50</sub>:** Lethal Concentration (gases) that kills 50% of the exposed animals. **ppm:** Concentration expressed in parts of material per million parts of air or water. **mg/m<sup>3</sup>:** Concentration expressed in weight of substance per volume of air. **mg/kg:** Quantity of material, by weight, administered to a test subject, based on their body weight in kg. **TDLo:** Lowest dose to cause a symptom. **TCLo:** Lowest concentration to cause a symptom. **TD<sub>01</sub>:** **LDLo,** and **LD<sub>01</sub>**, or **TC,** **TCLo,** **LCLo,** and **LC<sub>01</sub>**: Lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** **IARC:** International Agency for Research on Cancer. **NTP:** National Toxicology Program. **RTECS:** Registry of Toxic Effects of Chemical Substances. **IARC** and **NTP** rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI:** ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

**REPRODUCTIVE TOXICITY INFORMATION:** A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process.

### ECOLOGICAL INFORMATION:

**EC:** Effect concentration in water. **BCF:** Bioconcentration Factor, which is used to determine if a substance will concentrate in life forms that consume contaminated plant or animal matter. **TLm:** Median threshold limit. **log K<sub>ow</sub>** or **log K<sub>oc</sub>:** Coefficient of Oil/Water Distribution is used to assess a substance's behavior in the environment.

**REGULATORY INFORMATION:** This section explains the impact of various laws and regulations on the material.

### U.S.:

**EPA:** U.S. Environmental Protection Agency. **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association that establishes exposure limits. **OSHA:** U.S. Occupational Safety and Health Administration. **NIOSH:** National Institute of Occupational Safety and Health, which is the research arm of OSHA. **DOT:** U.S. Department of Transportation. **TC:** Transport Canada. **SARA:** Superfund Amendments and Reauthorization Act. **TSCA:** U.S. Toxic Substance Control Act. **CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act. Marine Pollutant status according to the DOT; CERCLA or Superfund; and various state regulations. This section also includes information on the precautionary warnings that appear on the material's package label.

### CANADA:

**WHMIS:** Canadian Workplace Hazardous Materials Information System. **TC:** Transport Canada. **DSL/NDSL:** Canadian Domestic/Non-Domestic Substances List.