SAFETY DATA SHEET

DYNAFLEX Part A Activator

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

<table>
<thead>
<tr>
<th>TRADE NAME (AS LABELED):</th>
<th>DYNAFLEX Part A</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCT DESCRIPTION:</td>
<td>Part A Urethane</td>
</tr>
<tr>
<td>CHEMICAL NAME/CLASS:</td>
<td>Aromatic Isocyanate in Polyether Triol</td>
</tr>
<tr>
<td>SYNONYMS:</td>
<td>IT00089</td>
</tr>
</tbody>
</table>

COMPANY/UNDERTAKING IDENTIFICATION:

<table>
<thead>
<tr>
<th>SUPPLIER/MANUFACTURER’S NAME:</th>
<th>Pecora Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS:</td>
<td>165 Wambold Road, Harleysville, PA 19438</td>
</tr>
<tr>
<td>EMERGENCY PHONE:</td>
<td>800-424-9300 (CHEMTREC, 24-hours)</td>
</tr>
<tr>
<td>BUSINESS PHONE:</td>
<td>215-723-6051 (Mon–Fri, 8 AM–5 PM ET)</td>
</tr>
<tr>
<td>PREPARATION DATE:</td>
<td>July 2011</td>
</tr>
<tr>
<td>REVISION DATE:</td>
<td>March 10, 2015</td>
</tr>
</tbody>
</table>

This product is sold for commercial use. This MSDS 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 Z400.1-2008 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.

<table>
<thead>
<tr>
<th>Classification</th>
<th>GHS01</th>
<th>GHS02</th>
<th>GHS03</th>
<th>GHS04</th>
<th>GHS05</th>
<th>GHS06</th>
<th>GHS07</th>
<th>GHS08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Statements Codes</td>
<td>H351, H331, H319, H335, H334, H317, H412</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazard Symbols/Pictograms</td>
<td>GHS06, GHS08</td>
<td></td>
<td></td>
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</tbody>
</table>

EMERGENCY OVERVIEW:

PHYSICAL DESCRIPTION: This product is a clear, light yellow liquid with an odor characteristic of isocyanates.

HEALTH HAZARDS: DANGER! Inhalation of vapors may be harmful or fatal. Harmful or fatal if swallowed. This compound 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. Contain compounds that are suspect carcinogens.

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 high level of the Polyether Triol 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®)

<table>
<thead>
<tr>
<th>Health</th>
<th>3*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>2</td>
</tr>
</tbody>
</table>

See Section 16 for definitions of ratings

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>Slight</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>*</td>
</tr>
<tr>
<td>Serious</td>
<td>Severe</td>
<td>Chronic</td>
</tr>
</tbody>
</table>

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

CANADIAN WHMIS CLASSIFICATION: Class D1A, Class D2A, 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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>W/W%</th>
<th>GHS Classification Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyether Triol</td>
<td>25791-96-2</td>
<td>70.0-90.0</td>
<td>Classification: Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hazard Statement Codes: Not Applicable</td>
</tr>
</tbody>
</table>
### 3. COMPOSITION AND INFORMATION ON INGREDIENTS (Continued)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>W/W%</th>
<th>GHS Classification Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Polyisocyanate</td>
<td></td>
<td>10.0-20.0</td>
<td>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</td>
</tr>
<tr>
<td>Proprietary Polyisocyanate</td>
<td></td>
<td>5.0-10.0</td>
<td>Classification: Acute Inhalation Toxicity Cat. 3, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, Skin Irritation Cat. 2, Respiratory Sensitization Cat. 1, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 2</td>
</tr>
<tr>
<td>Stannous Octoate-Based Stabilizer</td>
<td>Mixture</td>
<td>Trace</td>
<td>Classification: Skin Irritation Cat. 2, Eye Irritation Cat. 2, STOT (Inhalation-Respiratory System) SE Cat. 3, Sensitization Cat. 1</td>
</tr>
<tr>
<td>Stannous Octoate-Based Stabilizer</td>
<td></td>
<td></td>
<td>Hazard Statement Codes: H315, H319, H335</td>
</tr>
</tbody>
</table>

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 MSDS 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.

**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:** Not available for product. For Polyether Triol: 160-218°C (320-424°F)

**AUTOINOXIDATION:** Not available for product. For Polyether Triol: 202°C (390°F)

**FLAMMABLE LIMITS IN AIR:** Not known for product.

**EXTINGUISHING MEDIA:**

- **SUITEatable 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 combustible liquid which is also toxic by inhalation 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.

**SPECIAL PROTECTIVE ACTIONS FOR FIREFIGHTERS:** 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 poly pads. Absorb spilled liquid with clay, sand, poly pads, 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 rinse 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, dusts, vapors or mist. Do not taste or swallow. Use only with adequate ventilation. 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.

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:

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS#</th>
<th>Guideline</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Polyisocyanate</td>
<td></td>
<td>ACGIH TLV TWA</td>
<td>0.005 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA PEL TWA</td>
<td>0.05 ppm (vacated 1989 PEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA PEL STEL</td>
<td>0.02 ppm [skin] (vacated 1989 PEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NIOSH REL TWA</td>
<td>0.005 ppm [skin]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NIOSH REL STEL</td>
<td>0.02 ppm [skin]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG MAK TWA</td>
<td>0.005 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG MAK PEAK</td>
<td>1•MAK 15 minute average value, 1-hr interval, 4 per shift</td>
</tr>
</tbody>
</table>

NE = Not Established.  NIC = Notice of Intended Change  See Section 16 for Definitions of Terms Used.
8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)


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.

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.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is available for the product.

FORM: Liquid.

COLOR: Clear, yellow.

MOLECULAR FORMULA: Mixture.

ODOR: Characteristic of isocyanates.

ODOR THRESHOLD: 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.

The following information is available for the Polyether Triol component.

MOLECULAR FORMULA: C(3n+3)-H(6n+8)-O(n+3)

MOLECULAR WEIGHT: 266-6000 (average)

ODOR: Gasoline-like.

ODOR THRESHOLD: Not available.

VAPOR DENSITY: Not available.

BOILING POINT: > 200°C (> 392°F)

PURIFICATION POINT: ~32 to -18°C (~ -26 to 0°F)

EXPANSION RATIO: Not applicable.

SPECIFIC GRAVITY @ 20°C (water = 1): 1.01-1.15

pH: Not available.

EVAPORATION RATE (nBu/Ac = 1): Not available.

SPECIFIC VOLUME (ft³/lb): Not available.

SOLUBILITY IN WATER: 1-50 g/100 mL

SPECIFIC VOLUME (ft³/lb): Not available.

VAPOR PRESSURE: Extremely low.

COEFFICIENT WATER/OIL DISTRIBUTION: Not available.

VOC (less water and exempt): 0 g/L

Dynaflex Activator Part A

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March 10, 2015
The following information is available for the proprietary polyisocyanate components (as a mixture).

**MOLECULAR FORMULA:** Mixture

**ODOR:** Solvent-like

**SPECIFIC GRAVITY @ 20°C (water = 1):** ~1.15

**VAPOR DENSITY (air = 1):** > 1

**pH:** Not available.

**BOILING POINT:** ~ 145.7°C (~ 293°F)

**SOLUBILITY IN WATER:** Reacts.

**FLASH POINT:** ~ 40°C (~ 104°F)

**10. STABILITY and REACTIVITY**

**CHEMICAL STABILITY:** Stable under normal circumstances of use and handling. May become unstable if stabilizer becomes depleted.

**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.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion: Thermal decomposition of this product can generate formaldehyde, carbon oxides, 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 Triol component, 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**

**TOXIC 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 may 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.

**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 Proprietary Polyisocyanates. Inhalation can cause respiratory sensitization and allergic reaction as described further in this Section.

**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.

**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.

**PROPRIETARY POLYISOCYANATE:**

- Standard Drape Test (Skin-Rabbit) 1%/5 days-continuous
- LD₅₀ (Oral-Rat) 4825 mg/kg
- LD₅₀ (Oral-Cal) 1 mL/kg
- LC₅₀ (Inhalation-Rat) 123 mg/m³/4 hours
- LC₅₀ (Inhalation-Guinea Pig) 118 mg/m³/1 hour: Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: dyspnea; Nutritional and Gross Metabolic: weight loss or decreased weight gain
- LD₅₀ (Skin-Rat) 1 mL/kg
- LD₅₀ (Oral-Mouse) 2500 µL/kg
- TC₅₀ (Inhalation-Rat) 7.5 mg/m³/6 hours: Lungs, Thorax, or Respiration: acute pulmonary edema, changes in lung weight
- TC₅₀ (Inhalation-Rat) > 1 mg/m³/6 hours: Lungs, Thorax, or Respiration: other changes
- TC₅₀ (Inhalation-Rat) > 7.5 mg/m³/6 hours: Nutritional and Gross Metabolism: body temperature decrease
- TC₅₀ (Inhalation-Rat) 1370 µg/m³/4 hours/4 weeks-intermittent: Lungs, Thorax, or Respiration: changes in lung weight: Liver: changes in liver weight; Nutritional and Gross Metabolism: weight loss or decreased weight gain

**PROPRIETARY POLYISOCYANATE (continued):**

- TCLo (Inhalation-Mouse) 7.5 mg/m³/3 days-intermittent: Immunological Allergic: increased immune response; Biochemical: Metabolism (Intermediate): other proteins, effect on inflammation or mediation of inflammation
- TD₅₀ (Oral-Mouse) 415 mg/kg: female 8-12 days after conception: Reproductive: Effects on Newborn: viability index (e.g., # alive at day 4 per # born alive)
- TD₅₀ (Skin-Mouse) 220 mg/kg/12 days-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure); Biochemical: Metabolism (Intermediate): other proteins, effect on inflammation or mediation of inflammation
- TD₅₀ (Skin-Mouse) 480 mg/kg/28 days-intermittent: Immunological Allergic: increase in humoral immune response
- TD₅₀ (Skin-Mouse) 1 pph/3 days-intermittent: Immunological Allergic: increased immune response; Biochemical: Metabolism (Intermediate): other proteins, effect on inflammation or mediation of inflammation

**POLYETHER TRIOL:**

- Open Irritation Test (Skin-Rabbit) 500 mg: Mild
- LD₅₀ (Oral-Rat) > 64 mL/kg
- LD₅₀ (Skin-Rabbit) > 20 mL/kg
11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

**PROPRIETARY POLYISOCYANATE:**
- 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 ppm/5 hours/5 days: Lungs, Thorax, or Respiration: respiratory obstruction.

TClO (Inhalation-Human) 20 ppm/2 hours: Lungs, Thorax, or Respiration: cough, sputum.

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

TClO (Inhalation-Human) 80 ppm: Sensitization, experimental (after topical exposure): 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): lacrimation.

Behavioral: excitement; Lungs, Thorax, or Respiration: dyspnea.

LC<sub>50</sub> (Inhalation-24 hours hours: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, changes in pulmonary vascular resistance.

LD<sub>50</sub> (Oral-Rat) 6.17 mg/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): 8 mL/kg.

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

TClO (Inhalation-Rat) 0.004 mg/nm/4 hours: Liver: hepatitis (hepatocellular necrosis), zonal.

TClO (Inhalation-Rat) 204 µg/cm²/24 hours: Behavior: muscular contraction or spasticity; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels; true cholinesterase, Metabolism (Intermediary): lipids including transport.

TClO (Inhalation-Rat) 0.004 mg/cm²/7 days: Continuous; Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi.

TClO (Inhalation-Rat) 25 µg/cm²/5 weeks- intermitternt: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, chronic pulmonary edema, Related to Chronic Data: death.

TClO (Inhalation-Mouse) 900 ppm/6 hours/14 days- intermitternt: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Skin and Appendages: other changes; Sense Organs and Special Senses (Eye): effect, not otherwise specified; Sense Organs and Special Senses (Ear): effect, not otherwise specified.

TClO (Inhalation-Mouse) 1500 ppm/71 days- intermitternt: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi; Related to Chronic Data: death.

TClO (Inhalation-Rabbit) 1500 ppm/6 hours/79 days- intermitternt: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi.

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

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

TDLo (Skin-Mouse) 15 mg/kg/3 days- intermitternt: 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- intermitternt: Immunological Including Allergic: increased immune response and/or other changes.

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

**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.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>IARC</th>
<th>NTP</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>PROP 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Polyisocyanate</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Proprietary Polyisocyanates</td>
<td>2B</td>
<td>No</td>
<td>R</td>
<td>Ca</td>
<td>A4</td>
<td>No</td>
</tr>
</tbody>
</table>


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

**SENSITIZATION TO THE PRODUCT:** This product contains Proprietary Polyisocyanate compounds, which are known human skin and respiratory sensitizers. Exposure can cause allergic reactions. Cross-sensitization between different isocyanates may 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 Proprietary Polyisocyanates 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 Proprietary Polyisocyanate. Following removal from exposure, some sensitized workers may manifest 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 Proprietary Polyisocyanates 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 inhaled Proprietary Polyisocyanate developed extensive skin rashes that can last weeks.

**TOXICOLOGICAL SYNERGISTIC PRODUCTS:** None known.

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

**Mutagenicity Embryotoxicity/Teratogenicity/Reproductive Toxicity:** No information is available.

**BIOLOGICAL EXPOSURES INDICES (BEIS):** No BEI’s have been 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 Proprietary Polyisocyanate components.

Proprietary Polyisocyanate: Proprietary Polyisocyanate hydrolyzes rapidly in aqueous solution; therefore, leaching and adsorption to sediment will not be environmentally important.

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

Proprietary Polyisocyanate: If released to air, a vapor pressure of 8 \times 10^{-2} \text{ mm Hg} at 25^\circ C indicates Proprietary Polyisocyanate will exist solely as a vapor in the ambient atmosphere. Vapor-phase Proprietary Polyisocyanate 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, Proprietary Polyisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. Proprietary Polyisocyanate 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.

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

Proprietary Polyisocyanate: Proprietary Polyisocyanate hydrolyzes rapidly in aqueous solution; therefore, bioconcentration will not be environmentally important.

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric and aquatic environments should be avoided. The following aquatic toxicity data are available for the Proprietary Polyisocyanate components.

Proprietary Polyisocyanate: LC50 (fathead minnow) 24 hours = 194.9 mg/L, LC50 (fathead minnow) 48 hours = 172.1 mg/L, LC50 (fathead minnow) 96 hours = 164.5 mg/L, TLM (fathead minnow) 96 hours = 10-1 ppm (est.), LC50 (Pimephales promelas fathead minnow) 24 hours = 195 mg/L.

Proprietary Polyisocyanate (continued): LC50 (Pimephales promelas fathead minnow) 48 hours = 172 mg/L/Conditions of bioassay not specified, LC50 (Pimephales promelas fathead minnow) 96 hours = 164 mg/L/Conditions of bioassay not specified, No Significant Mortality Below (Palaemonetes pugia grass shrimp) 308 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 not be a hazardous waste as defined by U.S. federal regulation (40 CFR 261) if discarded or disposed. 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: Not applicable.

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: This product is NOT classified as Dangerous Goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is NOT classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is NOT classified as dangerous goods, per the International Air Transport Association.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is not classified as dangerous goods, per the International Maritime Organization.

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.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>SECTION 302 EHS (TPQ) (40 CFR 355, Appendix A)</th>
<th>SECTION 304 RQ (40 CFR Table 302.4)</th>
<th>SECTION 313 TRI (threshold) (40 CFR 372.65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Polyisocyanate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Proprietary Polyisocyanate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Proprietary Polyisocyanate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

U.S. SARA 302 EXTREMELY HAZARDOUS THRESHOLD PLANNING QUANTITY (TPQ): Proprietary Polyisocyanate: 500 lb (227 kg); Proprietary Polyisocyanate: 500 lb (227 kg); Proprietary Polyisocyanate: 100 lb (454 kg)

U.S. SARA 304 EXTREMELY HAZARDOUS REPORTABLE QUANTITY (RQ): Proprietary Polyisocyanate: 500 lb (227 kg); Proprietary Polyisocyanate: 100 lb (454 kg); Proprietary Polyisocyanate: 100 lb (454 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. 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. CERCLA REPORTABLE QUANTITY (RQ): Proprietary Polyisocyanate = 100 lb (45.4 kg); Proprietary Polyisocyanate = 100 lb (45.4 kg); Proprietary Polyisocyanate = 10,000 lb (4540 kg); Proprietary Polyisocyanate = 10,000 lb (4540 kg).

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Proprietary Polyisocyanate Mixture is on the California Proposition 65 lists. WARNING! This product contains a compound known to the State to cause cancer.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DDL/NDSSL 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, 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! COMBUSTIBLE 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. POSES ASPIRATION HAZARD IF SWALLOWED. 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 CO2. 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: Carcinogenic Category 2, Acute Inhalation Toxicity Category 3, Eye Irritation Category 2, Specific Target Organ Toxicity (Inhalation–Respiratory Irritation) Single Exposure Category 3, Skin Irritation Category 2, Respiratory Sensitizer Category 1, Skin Sensitization Category 1, Aquatic Chronic Toxicity Category 3

Signal Word: Danger


Precautionary Statements: P403 + P233, P405, P501


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

Hazard Symbols/Pictograms: GH506, GH508

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information presented in this Material Safety Data Sheet is prepared 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.
DEFINITIONS OF TERMS

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

**ACRONYMS:**

**CHEMTRC:** 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 day, 8 hours.

**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 MAKs Ranges:** Categories of germ cell mutagens that have been shown to increase the mutation frequency in the progeny of exposed humans. 2: Germ cell mutagens that have been shown to increase the mutation frequency in the progeny of exposed mammals. 3A: Substances that have been shown to induce genetic damage in germ cells of humans or animals, which produces significant effects on the genetic material of the germ cells. 3B: Substances that have been shown to reach the germ cells in an active form. 4: Substances that are suspected of being germ cell mutagens because of their genetic effects in mammalian somatic cell in vivo; in exceptional cases, substances for which there are no 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 significant. These are designated by MAK value, are accepted, 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 to the embryo or fetus (to the developing organism, even if 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 embryo or fetus may be induced when exposure levels are expected to exceed MAK or 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 Rating 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 of a gas, vapor, or aerosol that can result in death or severe injury within minutes without escape-preventing or permanent injury.

**LOQ:** Limit of Quantitation.

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

**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 (unless otherwise specified) that shall not be exceeded at any time during a workday.

**NIOSH RELs:** NIOSH’s Recommended 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 PELs that, as vacated by OSHA Court Order.

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

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

**TWA:** Threshold Limit Value. An airborne concentration of a substance that represents conditions under which, if exceeded, it is to be regarded as hazardous. This concentration may not be exceeded without adverse effect. The duration must be considered, including the 8-hour.

**TWA - PEL:** Workplace Environmental Exposure Limits from the AIHA.

**HAZARD RATINGS:**

**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 hazard.

**HEALTH HAZARD:** This includes Significant Health Risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. Mechanical irritation may occur. *Eye Irritation:* Essentially non-irritating, minimal effects clearing in < 24 hours. Mechanical irritation may occur. *Inhalation:* Oral Toxicity LD₅₀ > 5000 mg/kg. Dermal Toxicity LD₅₀ or Rabbit > 2000 mg/kg. Inhalation Toxicity 4-hrs LC₁₀₀ > 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. *Dermal Toxicity:* Oral/Parenteral LD₅₀ > 200-400 mg/kg. Slightly to mildly irritating, but reversible within 7 days. *Eye Irritation:* Moderately to severely irritating. *Respiratory tract irritation:* Oral/Parenteral LD₅₀ > 20-400 mg/kg. *Skin Irritation:* Slightly irritating. 2: Moderate Hazard: Temporary or transitory injury may occur; prolonged exposure may be hazardous. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. *PII: Dermal Toxicity:* Oral/Parenteral LD₅₀ > 5, with no destruction of dermal tissue. *Eye Irritation:* Moderately to severely irritating. *Respiratory tract irritation:* Oral/Parenteral LD₅₀ > 20-200 mg/kg. *Skin Irritation:* Slightly irritating to very irritating. 3: Severe Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; *Skin Irritation:* Slightly irritating to very irritating; *Eye Irritation:* Not appropriate. Do not rate at 4. Based on eye irritation alone. Oral Toxicity LD₅₀, Rat ≤ 1 mg/kg. Dermal Toxicity LD₅₀, Rat or Rabbit ≤ 20 mg/kg. Inhalation Toxicity LD₅₀, 4-hrs Rat ≤ 0.05 mg/L. 4: Very Severe Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; *Skin Irritation:* Very irritating. *Eye Irritation:* Not appropriate. Do not rate at 4. Based on eye irritation alone. Oral Toxicity LD₅₀, Rat ≤ 1 mg/kg. Dermal Toxicity LD₅₀, Rat or Rabbit ≤ 20 mg/kg. Inhalation Toxicity LD₅₀, 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. Materials require considerable pre-heating, under all ambient temperature conditions. Normally, ignition will not occur before exposure to 815.5°C (1500°F) for at least 5 minutes, but may be self-igniting. 2 Moderately Hazard: Materials that must be pre-heated before exposure to relatively high ambient temperatures before ignition can occur. Materials in this degree of classification do not burn under normal conditions, form flammable mixtures. *Organic Peroxides:* Materials that are normally stable, but can become unstable at high temperatures and/or pressures and may result from single or repeated exposures; extremely toxic; irreversible injury may result from contact with skin; very irritating; *Skin Irritation:* Not appropriate. Do not rate as a 4, based on eye irritation alone. Oral Toxicity LD₅₀, Rat ≤ 1 mg/kg. Dermal Toxicity LD₅₀, Rat or Rabbit ≤ 20 mg/kg. Inhalation Toxicity LD₅₀, 4-hrs Rat ≤ 0.05 mg/L.

**Explosives:** Substances that are Non-Explosive. *Compressed Gases* No Rating. Pyrotechnic: No Rating. Oxidizers: No rating. Unsuitable Substances: Substances that will not polymerize, decompose, condense, or self-react. 1 Water Reactivity: Materials that change or decompose upon exposure to moist conditions. *Organic Peroxides:* Materials that are normally stable, but can become unstable at high temperatures and/or pressures. *Flammable Cyclic: Materials that may react violently with water. *Organic Peroxides:* Materials that, in themselves, are normally unstable and will readily undergo violent chemical reaction, 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 may 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 psi]. *Pyrophoric:* No Rating. Oxidizers: Packaging Group II 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. *Ble Reactives:* Materials that exhibit a high temperature of decomposition at any time, even at temperatures below 49°C (116°F). A risk of damage to the developing embryo or fetus when MAK and BAT values are observed.

**Other Information:**

**Reference Information:**

**Marking Information:**

**Contact information:**

**Other Information:**

**References:**

**Data Sources:**

**Contact information:**

**Methods of Evaluating Information for the Purpose of Classification:**

**Bridging principles were used to classify this product.

**Revision Details:** June 2012: Up-date and revise entire MSDS to include current GHS requirements.

**Date of Printing:** March 10, 2015

**DEFINITIONS OF TERMS**

**KEY ACRONYMS:**
DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued)

PHYSICAL HAZARD: Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials. Gases and vapors with an Lc50 for acute inhalation toxicity greater than 10,000 ppm. Dusts and mists with an Lc50 for acute inhalation toxicity greater than 200 mg/L. Materials with an Ld50 for acute dermal toxicity greater than 2000 mg/kg. Materials with an Ld50 for acute oral toxicity greater than 2000 mg/kg. Dusts and mists with an Lc50 for acute inhalation toxicity greater than 10 mg/L but less than or equal to 200 mg/L. Materials with an Lc50 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 Ld50 for acute oral toxicity greater than 50 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 Lc50 for acute inhalation toxicity greater than 3,000 mg/m3 but less than or equal to 5000 mg/m3. Dusts and mists with an Lc50 for acute inhalation toxicity greater than 500 mg/m3 but less than or equal to 2000 mg/m3. Materials with an Lc50 for acute dermal toxicity greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials that are primary skin irritants or sensitizers. Materials whose Ld50 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 Lc50 for acute inhalation toxicity greater than 1,000 mg/m3 but less than or equal to 2000 mg/m3. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth of its Lc50 for acute inhalation toxicity, if its Lc50 is less than or equal to 5000 mg/m3 but less than or equal to 10,000 mg/m3. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-6.5°F) that cause severe tissue damage, depending on duration of exposure. Explosive or reactive metallic irritants at flash point (e.g., common household flammable liquids and substances that cause flammable 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 wastes 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).

FLAMMABILITY HAZARD: 0 Materials that in themselves 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 exotherm at temperatures below or equal to or above 20°C (68°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) or above 0.01 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) or above 0.01 W/mL and below 0.01 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 will not be ignited under conditions before initiation. Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) or above 0.01 W/mL and below 0.01 W/mL. 4 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) or above 0.01 W/mL and greater than 0.01 W/mL.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association’s (NFPA) Recommended Practice for the Storage and Handling of Combustible Liquids (NFPA 30) and the CLASSIFICATION OF FLAMMABLE MATERIALS AND COMBUSTIBLE SOLVENTS IN THE TRANSPORT OF DANGEROUS GOODS, MODEL REGULATIONS (1994) (TDG). These documents provide the basis for determining the flammable range of a liquid by performing a flash and fire point test according to the test methods specified in the documents. In general, the flammable range is the range of concentrations of flammable vapors in air that will form an ignitable mixture with air near the surface of the liquid or within the test vessel used. The flammable upper and lower limits are typically determined by forming and igniting a mixture of the liquid with air at temperatures of 35°C (95°F) and 45°C (113°F), respectively.

AUTONOMOUS 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 gaseous mixture that will ignite and burn with a flame. UEL: Highest concentration of a flammable vapor or gaseous mixture that will ignite and burn with a flame.

TOXICOLOGICAL INFORMATION: Hazardous materials as derived from human data, animal studies, or from the results of studies with similar compounds are presented. LD50: Lethal Dose (solids & liquids) that kills 50% of the exposed animals. LC50: 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/m3. 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. TDX: Lowest dose to cause a symptom. TCLo: Lowest concentration to cause a symptom. LD50, LD50, and LD50: 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 ratemems must be used in determining the potential carcinogenicity of substances that have not been evaluated by these agencies. The National Toxicology Program (NTP) in the National Institute on Environmental Health Sciences (NIEHS) has adopted the International Agency for Research on Cancer (IARC) monographs for the U.S. Department of Health and Human Services and other agencies. The NTP Monographs are the source of the majority of ratemems. The most current edition of the IARC monographs is always Consulted. The NTP Monographs can be accessed at http://ntp.niehs.nih.gov. TDI: Threshold Limit Value. TWA: Time-weighted Average. STEL: Short Term Exposure Limit.

REPRODUCTION INFORMATION: A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryo-toxic 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 toxic 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 KOW: Coefficient of Oil/Water Distribution is used to assess a material’s potential for bioaccumulation or behavior in the environment.

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