

SAFETY DATA SHEET



Pecora P-75

1. PRODUCT IDENTIFICATION

IDENTIFICATION of the SUBSTANCE or PREPARATION

| | |
|---------------------------------|--------------------------------|
| <u>TRADE NAME (AS LABELED):</u> | Pecora P-75 |
| <u>PRODUCT DESCRIPTION:</u> | Primer |
| <u>CHEMICAL NAME/CLASS:</u> | Isocyanates in Solvent Mixture |
| <u>SYNONYMS:</u> | None |
| <u>RELEVANT USE:</u> | Sealant Primer |
| <u>USES ADVISED AGAINST:</u> | Other Than Relevant Use |

COMPANY/UNDERTAKING IDENTIFICATION:

| | |
|--------------------------------------|--|
| <u>SUPPLIER/MANUFACTURER'S NAME:</u> | Pecora Corporation |
| <u>ADDRESS:</u> | 165 Wambold Road, Harleysville, PA 19438 |
| <u>EMERGENCY PHONE:</u> | 800-424-9300 (CHEMTREC, 24-hours) |
| <u>BUSINESS PHONE:</u> | 215-723-6051 (Mon–Fri, 8 AM–5 PM ET) |
| <u>PREPARATION DATE:</u> | September 8, 2011 |
| <u>REVISION DATE:</u> | July 23, 2018 |

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 product, 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, Canadian WHMIS 2015 and the Global Harmonization-required information is included in appropriate sections based on the Global Harmonization Standard format. This product has been classified in accordance with the hazard criteria of the countries listed above and the SDS contains all the information required by the Canadian WHMIS 2015 [HPR-GHS], the Global Harmonization Standard and OSHA 1910.120.

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with Global Harmonization Standard under U.S. OSHA Hazard Communication Standard, Canadian WHMIS HPR-GHS 2015.

Classification: Flammable Liquid Cat. 2, Carcinogenic Cat. 2, Reproductive Toxicity Cat. 2, Acute Inhalation Toxicity Cat. 2, Aspiration Hazard Cat. 1, STOT RE 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, STOT (Inhalation-Central Nervous System) SE Cat. 3, Aquatic Chronic Toxicity Cat. 3

Signal Word: Danger

Hazard Statement Codes: H225, H351, H361fd, H330, H304, H315, H319, H335, H334, H317, H373, H336, H412

Precautionary Statement Codes: P201, P202, P210, P233, P240, P241, P242, P243, P260, P264, P270, P271, P272, P273, P280, P284, P303 + P361 + P353, P370 + P378, P308 + P313, P301 + P310, P331, P304 + P340 + P310, P342 + P311, P305 + P351 + P338, P337 + P313, P302 + P352, P333 + P313, P312, P320, P403 + P233 + P235, P405, P501

Hazard Symbols/Pictograms: GHS02, GHS06, GHS08



EMERGENCY OVERVIEW:

Physical Description: This product is a colorless to straw-colored, corrosive, highly flammable liquid with a solvent odor.

Health Hazards: DANGER! Inhalation of vapors may be harmful or fatal and cause adverse central nervous system effects. Harmful or fatal if swallowed. This compound can cause irritation by all routes of exposure. May cause toxic systemic effects by skin absorption. Can cause skin and respiratory sensitization and allergic reaction. Contains compounds that are suspect carcinogens and a compound that is a suspect reproductive toxin.

Flammability Hazard: This product is highly flammable and can ignite if exposed to temperature or direct flame.

Reactivity Hazard: This product may have some sensitivity to water and react to form toluenediamine and carbon dioxide. This reaction is not expected to be violent.

Environmental Hazard: This product has not been tested for environmental impact. All release to the environment should be avoided. Contains a compound that can cause harm to aquatic organisms.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS®)

| | | |
|------------------------|-----------|---|
| Health | 3* | See Section 16 for definitions of ratings |
| Flammability | 3 | 0 = Minimal 3 = Serious |
| Physical Hazard | 1 | 1 = Slight 4 = Severe |
| | | 2 = Moderate * = Chronic |

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

CANADIAN WHMIS (HPR-GHS) 2015 CLASSIFICATION AND SYMBOLS: See Section 16 for in Classification and Symbols under HPR-GHS 2015.

U.S. OSHA REGULATORY STATUS: This product has a classification under the Global Harmonization Standard, as applied under OSHA regulations, as given earlier in this Section. See Section 16 for full classification details.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

| Chemical Name | CAS # | W/W% | LABEL ELEMENTS GHS Classification under U.S. OSHA Hazard Communication Standard & Canadian WHMIS (HPR-GHS) 2015 Hazard Statement Codes |
|--|----------|------------|---|
| Toluene | 108-88-3 | 50.0% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 2, Reproductive Toxicity Cat. 2, Eye Irritation Cat. 2A, Aspiration Hazard Cat. 1, STOT (Central and Peripheral Nervous System) RE Cat. 2, Skin Irritation Cat. 2, STOT (Inhalation/Ingestion-Narcotic Effect) SE Cat. 3 Hazard Statement Codes: H225, H361d, H304, H373, H315, H319, H336 ADDITIONAL SELF-CLASSIFICATION: Classification: Acute Oral Toxicity Cat. 5 Hazard Statement Codes: H303 |
| Proprietary Aromatic Polyisocyanate (classification based on CAS # 26471-62-5) | | 30.0-50.0% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Skin Irritation Cat. 2, Skin Sensitization Cat. 1B, Eye Irritation Cat. 2A, STOT (Inhalation-Respiratory Irritation) Se Cat. 3, Aquatic Chronic Toxicity Cat. 2 Hazard Statement Codes: H351, H330, H315, H317, H319, H335, H334, H412 |
| Proprietary Glycol Ether | | 5.0-10.0% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 3 Hazard Statement Codes: H226 |
| Proprietary Aromatic Hydrocarbon | | 5.0-10.0% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 3, Acute Inhalation Toxicity Cat. 4, Acute Dermal Toxicity Cat. 4, Skin Irritation Cat. 2 Hazard Statement Codes: H226, H312 + H332, H315 ADDITIONAL SELF-CLASSIFICATION Classification: Reproductive Toxicity Cat. 2, Aspiration Hazard, Acute Oral Toxicity Cat. 5 Hazard Statement Codes: H361d, H304, H303 |
| Ethyl Benzene | 100-41-4 | 0.5-2.5% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 2, Acute Inhalation Toxicity Cat. 4 Hazard Statement Codes: H225, H332 ADDITIONAL SELF-CLASSIFICATION Classification: Carcinogenic Cat. 2 Hazard Statement Codes: H351 |
| 2,4-Toluene Diisocyanate | 584-84-9 | 0.15% | HARMONISED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 2, Skin Irritation Cat. 2, Skin Sensitization Cat. 1B, Eye Irritation Cat. 2A, STOT (Inhalation-Respiratory Irritation) Se Cat. 3, Aquatic Chronic Toxicity Cat. 2 Hazard Statement Codes: H351, H330, H315, H317, H319, H335, H334, H412 |
| 2,6-Toluene Diisocyanate | 91-08-7 | 0.05% | |
| Other Trace Components | | Balance | Classification: Not Applicable |

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

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.

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 this product is inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

Skin Exposure: If the product 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: Dermatitis or other pre-existing skin disorders, respiratory conditions or central nervous system disorders may be aggravated by exposure to this product.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT (calculated): 22°C (71.6°F)

AUTOIGNITION: Not known for product. For Toluene: 480°C (896°F)

FLAMMABLE LIMITS IN AIR: Not known for product.

For Toluene: LEL: 1.1%, UEL: 7.1%

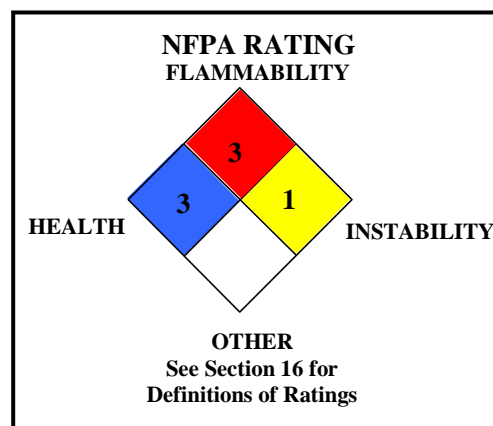
EXTINGUISHING MEDIA:

Suitable Extinguishing Media: Use extinguishing material suitable to the surrounding fire, including foam, halon, carbon dioxide and dry chemical.

Unsuitable Extinguishing Media: Water and halogenated media.

PROTECTION OF FIREFIGHTERS:

Special Hazards Arising from the Substance: This is a highly flammable liquid which is also toxic by inhalation and so presents a contact hazard to fire-fighters. This compound reacts with water to form toluenediamine and carbon dioxide. Not sensitive to mechanical impact under normal conditions. Vapors are heavier than air and can accumulate in confined spaces creating a toxicity and explosion hazard. Vapors can travel long distances and flashback to ignition source. Closed containers may develop pressure and rupture in event of fire or if contaminated with water.



5. FIRE-FIGHTING MEASURES (Continued)

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 can 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.

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: Note: reacted material may be allowed to harden while still in containers.

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.

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.

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. Avoid contact with water.

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 a primer. 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 in this section.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

Occupational/Workplace Exposure Limits/Guidelines:

| Chemical Name | CAS # | Guideline | Value |
|---|---|---|---|
| Ethyl Benzene | 100-41-4 | ACGIH TLV TWA OSHA PEL TWA OSHA PEL STEL NIOSH REL TWA NIOSH REL STEL DFG MAK TWA DFG MAK PEAK/CEIL(C) DFG MAK PREGNANCY CLASS | 20 ppm 100 ppm 125 ppm (vacated 1989 PEL) 100 ppm 125 ppm 20 ppm (skin) 2•MAK 15 minute average value, 1-hr interval 4 per shift (skin) C |
| Propylene Glycol Monoethyl Ether | | DFG MAK TWA DFG MAK PEAK/CEIL(C) AIHA WEEL TWA | 50 ppm 1•MAK 15 minute average value, 1-hr interval 4 per shift 50 ppm |
| Toluene | 108-88-3 | ACGIH TLV TWA OSHA PEL TWA OSHA PEL STEL NIOSH REL TWA NIOSH REL STEL DFG MAK TWA DFG MAK PEAK/CEIL(C) DFG MAK PREGNANCY CLASS | 20 ppm 200 ppm; 100 ppm (vacated 1989 PEL) 300 ppm (ceiling) 10 minute peak per 8-hr shift; 150 (vacated 1989 PEL) 100 ppm 150 ppm 50 (skin) 4•MAK 15 minute average value, 1-hr interval 4 per shift C |
| Proprietary Aromatic Polyisocyanate 2,4-Toluene Diisocyanate 2,6-Toluene Diisocyanate | As CAS# 26471-62-5 584-84-9 91-08-7 | ACGIH TLV TWA ACGIH TLV STEL OSHA PEL TWA OSHA PEL STEL NIOSH REL TWA NIOSH REL STEL NIOSH IDLH DFG MAK TWA DFG MAK PEAK/CEIL(C) DFG MAK PREGNANCY CLASS | 0.001 ppm (IVF) [skin], DSEN, RSEN 0.005 ppm (IVF) [skin], DSEN, RSEN NE 0.02 (ceiling) [CSA# 584-84-9 only] See Pocket Guide App. A (CAS# 584-84-9 only) See Pocket Guide App. A (CAS# 584-84-9 only) 2. 5 mg/m ³ (Ca) Can also occur as vapor & aerosol. Danger of sensitization of skin and airways. Can also occur as vapor & aerosol. Danger of sensitization of skin and airways. NE |
| Proprietary Aromatic Hydrocarbon | | ACGIH TLV TWA ACGIH TLV STEL OSHA PEL TWA OSHA PEL STEL NIOSH REL TWA NIOSH REL STEL DFG MAK TWA DFG MAK PEAK/CEIL(C) DFG MAK PREGNANCY CLASS | 100 ppm 150 ppm 100 ppm 150 ppm (vacated 1989 PEL) 100 ppm 150 100 (skin) 4•MAK 15 minute average value, 1-hr interval 4 per shift D |

NE: Not Established. IVF: Measured as the inhalable fraction and vapor. DSEN: May cause dermal sensitization. RSEN: May cause sensitization of the airways. See Section 16 for Definitions of Other Terms Used.

Biological Exposure Indices (BEIs): Currently, there are ACGIH Biological Exposure Indices (BEIs) determined for the components of this product, as follows:

| CHEMICAL: DETERMINANT | SAMPLING TIME | BEI |
|---|---|---|
| Ethyl Benzene • Sum of mandelic acid in urine and phenylglyoxylic acid in urine | • End of shift | • 0.15 g/g creatine |
| Toluene • Toluene in Blood • Toluene in Urine • o-Creosol in urine | • Prior to Last Shift of Workweek • End of shift • End of shift | • 0.02 mg/L • 0.03 mg/L • 0.3 mg/L creatine |
| Toluene Diisocyanate-2,4- (CAS# 584-84-9) or 2,6- (CAS# 91-08-70) or as a mixture of isomers (2015) • Toluene diamine in urine *, ** (* with hydrolysis), (** sum of 2,4 & 2,6- isomers) | • End of shift | • 1.5 µg/g Creatinine |
| Proprietary Aromatic Hydrocarbons • Methylhippuric Acid in Urine | • End of Shift | • 1.5 g/g Creatinine |

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 and standards.

Skin Protection: Wear chemical impervious gloves (e.g., Nitrile or Neoprene). Use triple gloves for spill response. If necessary, refer to appropriate regulations and standards.

Body Protection: Use body protection appropriate for task (e.g., lab coat, coveralls, Tyvek suit). 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 and standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

PERSONAL PROTECTIVE EQUIPMENT (continued):

Respiratory Protection: If aerosols, 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 and standards. The following are NIOSH respiratory protective equipment guidelines for the Diisocyanate components, which may present an inhalation hazard as well as the solvent component that can reach exposure levels in this product. These are presented for additional assistance in respiratory protective equipment selection.

ETHYL BENZENE **CONCENTRATION**

Up to 800 ppm:

RESPIRATORY PROTECTION

Any Chemical Cartridge Respirator with 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 powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s), or any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.

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.

TOLUENE

CONCENTRATION

Up to 500 ppm:

RESPIRATORY PROTECTION

Any chemical cartridge respirator with organic vapor cartridge(s), any PAPR with organic vapor cartridge(s), any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, any SAR, or any SCBA with a full facepiece.

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-TOLUENE DIISOCYANATE

2,6-TOLUENE DIISOCYANATE

CONCENTRATION

Based on NIOSH REL at

RESPIRATORY PROTECTION

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.

PROPRIETARY AROMATIC HYDROCARBON

CONCENTRATION

Up to 900 ppm:

RESPIRATORY PROTECTION

Any chemical cartridge respirator with organic vapor cartridge(s), or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s), or any supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.

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 self-contained positive-pressure breathing apparatus.

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

The following information is available for the product.

FORM: Liquid.

MOLECULAR WEIGHT: Mixture.

ODOR: Solvent.

VOC (less water and exempt): 692 g/L

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.

COLOR: Colorless to straw-colored.

MOLECULAR FORMULA: Mixture.

ODOR THRESHOLD: Not available.

The following information is available for the Toluene component.

MOLECULAR FORMULA: C₇H₈

ODOR: Gasoline-like.

VAPOR DENSITY: (air = 1) = 3.1

FREEZING/MELTING POINT: -95°C (-139°F)

SPECIFIC GRAVITY @ 20°C (water = 1): 0.86

SOLUBILITY IN WATER @ 25°C: 54-58 mg/100 mL

VAPOR PRESSURE @ 20°C: 22 mm Hg or 2.93 kPa

COEFFICIENT WATER/OIL DISTRIBUTION: Log P (oct) = 2.11-2.80

MOLECULAR WEIGHT: 92.13

ODOR THRESHOLD: 0.1-70 ppm.

BOILING POINT: 110.6°C (231.1°F)

EXPANSION RATIO: Not applicable.

pH: Not available.

EVAPORATION RATE (nBuAc = 1): 2.24

SPECIFIC VOLUME (ft³/lb): 5.5

The following information is available for the Proprietary Aromatic Polyisocyanate based on toluene diisocyanate component.

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)

MOLECULAR WEIGHT: Mixture

ODOR THRESHOLD: Not determined.

EVAPORATION RATE (n-BuAc = 1): Not available.

VAPOR PRESSURE @ 20°C: ~ 11 mbar

PERCENT VOLATILE: 25-25% (est.)

FREEZING/MELTING POINT: Not available.

OTHER SOLUBILITIES: Not available.

LOG COEFFICIENT WATER/OIL DISTRIBUTION: Not available.

10. STABILITY and REACTIVITY

CHEMICAL STABILITY: Stable under normal circumstances of use and handling. Due to the isocyanate components, contact with water and incompatible materials (see below) may result in hazardous polymerization, with production of heat and carbon dioxide. Closed containers may develop pressure and rupture on prolonged exposure to heat or if contaminated with water.

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, bases, metal compounds, amides, phenols, mercaptans, urethanes, urea, surface active agents, potassium chlorate, tetranitromethane, silver perchlorate, sulfur dichloride, nitrogen tetroxide, uranium hexafluoride, oxidizers, acids, alcohols, water and moisture. Due to Toluene content, this product can attack some plastics, elastomers and coatings, such as polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), polypropylene, acrylonitrile-butadiene-styrene (ABS), styrene-acrylonitrile (SAN), polyethersulfone, polyurethane (rigid), polybutylene terephthalate, polysulfone, high-density polyethylene (HDPE), ultra high molecular weight polyethylene (UHMWPE), cross-linked polyethylene (XLPE), polyphenylene oxide (Noryl), thermoset polyester, polystyrene and ethylene vinyl acetate (EVA), (nitrile rubber (Nitrile Buna N; NBR), ethylene propylene (EP), ethylene propylene diene (EPDM), ethylene propylene terpolymer (EPT), chloroprene, styrene-butadiene (SBR), polyurethane, butyl rubber (isobutylene isoprene), natural rubber, isoprene, neoprene, flexible polyvinyl chloride (PVC), chlorosulfonyl polyethylene (Hypalon), low density polyethylene (LDPE), silicone, ethylene vinyl acetate (EVA) and Fluoraz, coal tar epoxy and epoxy chemical resistant.

HAZARDOUS DECOMPOSITION PRODUCTS: *Combustion:* Thermal decomposition of this product can generate carbon oxides, nitrogen oxides, aldehydes, reactive hydrocarbons and organic acid vapors. *Hydrolysis:* Toluenediamine and carbon dioxide.

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 and carbon dioxide. Containers may rupture. Due to the isocyanate components, this product may react with water to produce toluenediamine.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS: The most significant routes of occupational exposure are inhalation and contact with skin and eyes.

The expected symptoms of exposure to this product are as follows:

Contact with Skin or Eyes: Depending on the duration of skin contact, skin exposure 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 (dry, red skin). The Diisocyanate components of this product are known skin sensitizers; subsequent exposure to very small amounts of the product may cause allergic reactions in susceptible individuals. 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 as well as adverse effects on the central nervous system. 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 or burn the tissues of the nose, mouth, throat, and upper respiratory system. Symptoms of exposure may include nose irritation, dry or sore or burning throat, runny nose, shortness of breath, wheezing and laryngitis. Severe exposure 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. Liver and kidney damage as well as disturbances to the heart have been reported from exposure to high concentration of vapors of Toluene. 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.

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 and central nervous systems, liver and kidneys.

CHRONIC EFFECTS: Direct eye contact may cause severe irritation or damage to eye tissue. Prolonged or repeated skin contact may cause dermatitis (dry, red skin). Components of this product are suspected carcinogens, mutagens and reproductive toxins.

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 that have available data. Due to the large amount of data available for components, only Human data, LD50 Oral-Rat, Oral-Mouse, Skin-Rabbit, Skin-Rat, LC50 Inhalation-Rat, Inhalation-Mouse, Skin and Eye Irritation data and mutagenic data are provided in this SDS. Contact Pecora Corporation for information on any additional data available.

PROPRIETARY GLYCOL ETHER:

LD₅₀ (Oral-Rat) 8532 mg/kg
LD₅₀ (Oral-Rat) 9000 mg/kg: Behavioral: coma
LD₅₀ (Oral-Mouse) > 5000 mg/kg: Behavioral: coma
LD₅₀ (Skin-Rabbit) > 5 gm/kg

ETHYL BENZENE:

Open Irritation Test (Skin-Rabbit) 15 mg/24 hours: Mild
Standard Draize Test (Eye-Rabbit) 500 mg: Severe
TCLo (Inhalation-Human) 100 ppm/8 hours: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Behavioral: sleep; Lungs, Thorax, or Respiration: other changes
TCLo (Inhalation-Human) 21,700 mg/m³: Behavioral: antipsychotic
TCLo (Inhalation-Human) 8700 mg/m³/6 minutes: Sense Organs and Special Senses (Eye): lachrymation
TCLo (Inhalation-Human) 4350 mg/m³: Sense Organs and Special Senses (Eye): conjunctive irritation; Behavioral: tolerance

ETHYL BENZENE (continued):

TCLo (Inhalation-Human) 4350 mg/m³: Sense Organs and Special Senses (Eye): conjunctive irritation
TCLo (Inhalation-Human) 10 ppm/4 hours: Cardiac: pulse rate; Lungs, Thorax, or Respiration: other changes
TCLo (Inhalation-Human) 30 mg/m³/7 years-intermittent: Behavioral: headache, irritability
LD₅₀ (Inhalation-Rat) 55,000 mg/m³/2 hours
LD₅₀ (Inhalation-Mouse) 35,500 mg/m³/2 hours
LD₅₀ (Inhalation-Mouse) 4000 ppm/4 hours
LD₅₀ (Oral-Rat) 3,500 mg/kg: Liver: other changes; Kidney/Ureter/Bladder: other changes
LD₅₀ (Oral-Rat) 3500 mg/kg
LD₅₀ (Skin-Rabbit) 17,800 µL/kg
LD₅₀ (Skin-Rabbit) > 5000 mg/kg

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

TOLUENE:

LDLo (oral, human) = 50 mg/kg
 TCLo (inhalation, man) = 100 ppm; Central nervous system effects
 TCLo (inhalation, human) = 200 ppm; Brain, Central nervous system, Blood effects
 Eye Irritancy (human) = 300 ppm
 Skin Irritancy (rabbit) = 435 mg; mild
 Skin Irritancy (rabbit) = 500; moderate
 Eye Irritancy (rabbit) = 870 mg; mild
 Eye Irritancy (rabbit) = 2 mg/24 hours; severe
 Eye Irritancy (rabbit) = 100 mg/30 seconds/rinse; mild
 LD₅₀ (oral, rat) = 5000 mg/kg
 LD₅₀ (skin, rabbit) = 12,124 mg/kg
 LC₅₀ (inhalation, mouse) = 400 ppm/24 hours
 TDLo (oral, rat) = 7280 mg/kg/female 6–19 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)
 TCLo (inhalation, rat) = 1500 mg/m³/24 hours/female 1–8 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: musculoskeletal system
 TCLo (inhalation, rat) = 1000 mg/m³/24 hours/female 7–14 days after conception; Reproductive: Specific Developmental Abnormalities: musculoskeletal system

TOLUENE (continued):

TCLo (inhalation, rat) = 2000 ppm/6 hours/female 7–17 days after conception; Reproductive: Maternal Effects: other effects; Reproductive: Effects on Newborn: physical
PROPRIETARY AROMATIC HYDROCARBON:
 Standard Draize Test (Eye-Human) 200 ppm
 LDLo (Oral-Human) 50 mg/kg
 LCLo (Inhalation-Human) 10,000 ppm/6 hours: Behavioral: general anesthetic; Lungs, Thorax, or Respiration: cyanosis; Blood: other changes
 TCLo (Inhalation-Human) 200 ppm: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): conjunctive irritation; Lungs, Thorax, or Respiration: other changes
 Standard Draize Test (Skin-Rabbit) 100%; Moderate
 Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Moderate
 Standard Draize Test (Eye-Rabbit) 87 mg/L: Mild
 Standard Draize Test (Eye-Rabbit) 5 mg/24 hours: Severe
 Open Irritation Test (Skin-Rat) 60 uL/8 hours: Mild
 LC₅₀ (Inhalation-Rat) 5000 ppm/4 hours
 LD₅₀ (Oral-Rat) 4300 mg/kg; Liver: other changes; Kidney/Ureter/Bladder: other changes
 LD₅₀ (Oral-Mouse) 2119 mg/kg
 LD₅₀ (Skin-Rabbit) > 1700 mg/kg

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 |
|----------------------------------|------|-----|-----|-------|-------|------|--|
| Ethyl Benzene | 2B | D | No | No | A3 | No | Yes |
| Toluene | 3 | II | No | No | A4 | No | Yes |
| Toluene 2,4 & 2,6-Diisocyanates | 2B | No | R | Ca | A4 | No | Toluene Diisocyanate (CAS# 26471-62-5) |
| Proprietary Aromatic Hydrocarbon | 3 | I | No | No | A4 | No | Yes |

IARC-3: Unclassifiable as to Carcinogenicity in Humans. EPA-D: Not Classifiable as to Human Carcinogenicity. EPA-I: Data are Inadequate Information to Assess Carcinogenic Potential; EPA-II (Inadequate Information to Assess Carcinogenic Potential); ACGIH TLV-A3: Confirmed Animal Carcinogen with Unknown Relevance of Humans. NTP-R: Reasonable Anticipated to Be a Human Carcinogen. NIOSH-Ca: Potential Occupational Carcinogen, with No Further Categorization. ACGIH TLV-A4: Not Classifiable as a Human Carcinogen.

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

SENSITIZATION TO THE PRODUCT: This product contains toluene diisocyanate 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 toluene 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 toluene diisocyanate. 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 toluene 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 inhaled toluene diisocyanate developed extensive skin rashes can last weeks.

TOXICOLOGICAL SYNERGISTIC PRODUCTS: Combined exposure to toluene and noise, Toluene and n-hexane, Toluene and aspirin or toluene, ethyl benzene and noise has caused a synergistic loss of hearing in animal studies. Increased hearing loss has also been observed in workers in some studies following long-term exposure to Toluene and noise. There have been several studies in humans and animals on the interaction of Aromatic Hydrocarbons with drugs, alcohol and other solvents. The Proprietary Aromatic Hydrocarbon has a high potential to interact with other compounds because it increases metabolic enzymes in the liver and decreases metabolic enzymes in the lungs. In general, exposure to related solvents, such as benzene, toluene and ethanol (alcohol) slows the rate of clearance of Aromatic Hydrocarbons from the body, thus enhancing its toxic effects.

REPRODUCTIVE TOXICITY INFORMATION: This product has not been tested for reproductive toxicity. The following information is available for some components.

Mutagenicity: Both positive and negative results have been obtained in studies for various mutagenic effects in peripheral blood lymphocytes of workers exposed to Toluene; mutagenicity cannot be determined.

Embryotoxicity/Teratogenicity: Toluene is a developmental toxicity hazard, based on information obtained from animal studies. Fetotoxicity (reduced fetal weight), behavioral effects (effects on learning and memory) and hearing loss (in males) have been observed in the offspring of rats exposed by inhalation to 1200 or 1800 ppm toluene. These effects were observed in the absence of maternal toxicity. The Aromatic Hydrocarbon (mixed isomers) are considered fetotoxic in humans, based on observations of reduced fetal weight, delayed ossification and persistent behavioral effects in animal studies in the absence of maternal toxicity. Other developmental effects have been observed in animal studies in the presence of maternal toxicity. Several human population studies have suggested a link between exposure to organic solvents (including Aromatic Hydrocarbon) and increased occurrence of miscarriages or birth defects in children. However, in the majority of cases, there was exposure to a variety of solvents at the same time, exposures were ill-defined, and the number of cases examined was small.

Reproductive Toxicity: No information is available.

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 main solvent components.

PROPRIETARY GLYCOL ETHER: No data available.

TOLUENE: In association with clay minerals, Toluene's adsorption is inversely proportional to the pH of the soil. The reported Koc are 178 in a sandy soil and as 37 (Wendover silty loam), 160 (Grimsby silt loam), 160 (Vaudreil sandy loam) and 46 (sandy soil), 166 in lake sediment. According to a classification scheme, this Koc data suggests that Toluene is expected to have high to moderate mobility in soil. Also, based on a classification scheme, Koc values of 37-178 measured in soil indicates that Toluene is expected to have high to moderate mobility in soil.

PROPRIETARY AROMATIC HYDROCARBON: Several experimental Koc values for this compound have been reported depending upon the pH and organic carbon content of the soil. Batch experiments conducted with five low organic carbon content (0.04-1.12%), field contaminated soils (3 silty clay and two sandy loams) yielded Koc values ranging from 39-365. This compound in Norwegian forest soil at pH 5.6 and organic carbon content of 0.2 percent has a reported experimental Koc of 129; in Norwegian agricultural soil at pH 7.4 and organic carbon content of 2.2 percent has a reported experimental Koc of 158; in Norwegian forest soil at pH 4.2 and organic carbon content of 3.7 percent has a reported experimental Koc of 289. Based on a recommended classification scheme and the experimentally determined Koc values, this material is expected to have moderate to high mobility in soils. Aromatic Hydrocarbon isomers have been observed to pass through soil at a dune-infiltration site on the Rhine River and to leach into groundwater under a rapid infiltration site.

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

PROPRIETARY GLYCOL ETHER: This compound is readily biodegradable in activated sludge (OECD 301F, 99 % by DOC and OECD 301C, 87 % by BOD, after 28 days and in soil (DT50 < 1 day). This chemical is stable to chemical hydrolysis in water at pH 4 and 7, whereas it is hydrolyzed at pH 9 with half-life of 8.10 days at 25°C. Direct photo-degradation is not expected because the material has no absorption band in the UV and VIS region, whereas indirect photo-degradation may occur as a result of reactions with photochemically generated hydroxy radicals, with the half-life of 3.1 hours. Although direct photo-degradation is not expected, this compound in air decomposes and disappears by photolytic reactions with photochemically generated hydroxy radicals. The indirect photochemical hydroxyl radical photolysis has an estimated half-life of 32 hours with an estimated rate constant of 1.19×10^{-11} cm³/mol sec and an assumed hydroxyl radical concentration 0.5×10^6 OH/cm³. For these reasons, there is little potential for accumulation of the compound in air sphere.

TOLUENE: Volatilization of Toluene from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 6.64×10^{-3} atm-cu m/mole. This compound may volatilize from dry soil surfaces based on a vapor pressure of 28.4 mm Hg at 25°C. Complete biodegradation of Toluene was observed in lab microcosm tests during a 40 hour incubation period using soils previously exposed to this material. The biodegradation half-life in various soils was reported as several hours to 71 days. Volatilization from water surfaces is expected based upon a Henry's Law constant of 6.64×10^{-3} atm-cu m/mole. Using this Henry's Law constant and an estimation method, volatilization half-lives for a model river and model lake are 1 hour and 4 days, respectively. The half-life of Toluene this material in aerobic and anaerobic water was reported as 4 and 56 days, respectively. According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, Toluene, which has a vapor pressure of 28.4 mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase material is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals, nitrate radicals and ozone molecules. The half-life for the reaction with hydroxyl radicals is estimated to be 3 days, calculated from its rate constant of 5.96×10^{-12} cu cm/molecule-sec at 25°C. The half-life for the nighttime reaction with nitrate radicals is estimated as 491 days calculated from its rate constant of 6.8×10^{-17} cu cm/molecule-sec at 25°C. The half-life for the reaction with ozone is estimated as 27,950 days calculated from its rate constant of 4.1×10^{-22} cu cm/molecule-sec at 25°C.

PROPRIETARY AROMATIC HYDROCARBON: Based upon an experimental vapor pressure of 7.99 mm Hg at 25°C, this compound is expected to exist entirely in the vapor phase in the ambient atmosphere. Vapor-phase material is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals with an estimated atmospheric lifetime of about 1-2 days. This compound is expected to have moderate to high mobility in soils based upon experimental Koc values obtained with a variety of soils at differing pH values and organic carbon content. Volatilization from moist soil surfaces is expected based on an experimental Henry's Law constant of 7.0×10^{-3} atm-cu m/mole. Biodegradation is an important environmental fate process for this compound. In general, it has been found that this material is biodegraded in soil and groundwater samples under aerobic conditions and may be degraded under anaerobic denitrifying conditions. In water, this compound is expected to adsorb somewhat to sediment or particulate matter based on its measured Koc values. This compound is expected to volatilize from water surfaces given its experimental Henry's Law constant. Estimated half-lives for a model river and model lake are 3 and 99 hours, respectively. Log K_{ow} = 3.5-68.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The BCFs of the Toluene component in eels is 13 and in golden ide 90. The estimated BCF for Proprietary Aromatic Hydrocarbon is 20. The estimated value for Proprietary Glycol Ether is 0.36. These values indicate low bioconcentration potential.

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 some major components. Only select data are given due to the large amount of data available. Contact Pecora for more information.

PROPRIETARY GLYCOL ETHER:

EC₅₀ (*Phytobacterium phosphoreum* Bacteria) 15 minutes = 5625 mg/L; Microtox test
EC₅₀ (*Selenastrum capricornutum* green alga) 0-72 hours = > 1,000 mg/L
EC₅₀ (*Daphnia magna* Water flea) 48 hours = 373 mg/L, open system, static
EC₅₀ (*Daphnia sp.* Water flea) 48 hours = > 408 mg/L
LC₂₀ (*Oryzias latipes* Medaka) 96 hours = 100 mg/L
LC₅₀ (*Pimephales promelas* Fathead Minnow) 96 hours = 2600 mg/L; Flow-through bioassay
LC₅₀ (*Pimephales promelas* Fathead Minnow) 96 hours = 161 mg/L, static
LC₅₀ (Bluegill/Sunfish) 96 hours = >10000 mg/L; Static bioassay
LC₅₀ (*Salmo gairdneri* Rainbow trout) 96 hours = 12,900-15,300 mg/L
LC₅₀ (*Oryzias latipes* Medaka) 96 hours = > 100 mg/L, calculated based on nominal concentrations, because measured concentrations were >80% of nominal concentrations

TOLUENE:

LC₅₀ (*Daphnia magna*) 48 hours = 11.5 mg/L
LC₅₀ (*Myxidopsis bahia*) 96 hours = 56 mg/L
LC₅₀ (goldfish) 24 hours = 58 mg/L
LC₅₀ (fathead) 24-96 hours = 24-56 mg/L
LC₅₀ (*Pimephales promelas* 30 days) 96 hours = 18-30, 34-42 mg/L

TOLUENE (continued):

LC₅₀ (*Lepomis macrochirus*) 96 hours = 13 mg/L
LC₅₀ (*Oncorhynchus kisutch*) 96 hours = 5.5 mg/L
EC₅₀ (*Daphnia magna*) 24 hours = 270 mg/L
EC₅₀ (*Daphnia magna*) 48 hours = 15 mg/L
EC₀ (*Pimephales promelas*) 32 days = 6 mg/L (growth inhibition)
EC₅₀ (*Oncorhynchus kisutch*) 40 days = 2.8 mg/L (growth inhibition)
EC₅₀ (*Cyprinodon variegatus*) 28 days = 7.7 mg/L (growth inhibition)
EC₅₀ (*Sarotherodon mossambica*) 70 days = 25 mg/L
EC₅₀ (*Salmo gairdneri*) 4 days = 5.8 mg/L (growth inhibition)
EC₅₀ (*Selenastrum capricornutum*) 3 days = 12 mg/L (growth inhibition)
EC₅₀ (*Poecilia reticulata* guppy) 14 days = 2.87 mmol/L

PROPRIETARY AROMATIC HYDROCARBON:

LC₅₀ (rainbow trout) 96 hours = 13.5 mg/L
LD₅₀ (goldfish) 24 hours = 13 mg/L
LC₅₀ (fathead minnow) 1 hour = 42 mg/L at 18-22°C
LC₅₀ (fathead minnow) 24-96 hours = 46 mg/L at 18-22°C
LC₅₀ (*Carassius auratus* goldfish) 96 hours = 16.9 ppm

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 1866
Proper Shipping Name: Resin solution, flammable
Hazard Class Number and Description: 3 (Flammable)
Packing Group: PG II
DOT Label(s) Required: Class 3 (Flammable)
North American Emergency Response Guidebook Number (2017): 127

Marine Pollutant: The components of this product not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101).

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

UN Identification Number: UN 1866
Proper Shipping Name: Resin solution, flammable
Hazard Class Number and Description: 3 (Flammable)
Packing Group: PG II
Hazard Shipping Label(s) Required: Class 3 (Flammable)
Special Provisions: None
Explosive Limit & Limited Quantity Index: 5 L
Excepted Quantities: E2
ERAP Index: None
Passenger Carrying Ship Index: None
Passenger Carrying Road or Rail Vehicle Index: 5 L

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

UN Identification Number: UN 1866
Proper Shipping Name: Resin solution, flammable
Hazard Class or Division: 3 (Flammable)
Hazard Shipping Label(s) Required: Class 3 (Flammable)
Packing Group: PG II
Excepted Quantities: E2
Passenger and Cargo Aircraft Packing Instruction: 353
Passenger and Cargo Aircraft Maximum Net Quantity Per Pkg: 5 L
Passenger and Cargo Aircraft Limited Quantity Packing Instruction: Y341
Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity Per Pkg: 1 L
Cargo Aircraft Only Packing Instruction: 364
Cargo Aircraft Only Maximum Net Quantity Per Pkg: 60 L
Special Provisions: A3
ERG Code: 3L

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

UN No.: 1866
Proper Shipping Name: Resin solution, flammable
Hazard Class Number: 3 (Flammable)
Labels: Class 3 (Flammable)
Packing Group: II
Special Provisions: None
Limited Quantities: 5 L
Excepted Quantities: E2
Packing: Instructions: P001; Provisions: PP1
IBCs: Instructions: IBC02; Provisions: None
Tanks: Instructions: T4; Provisions: T1, TP8
Ems: F-E, S-E
Stowage Category: Category B.
Segregation: None

Marine Pollutant: No component of this product is designated by the IMO to be a Marine Pollutant.

15. REGULATORY INFORMATION

U.S. REGULATIONS:

U.S. SARA Reporting Requirements: The 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 and are listed as follows:

| 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) |
|---|---|--|--|
| Ethyl Benzene | No | No | Yes |
| Proprietary Glycol Ether As a glycol ether | No | No | Yes |
| Toluene | No | No | Yes |
| 2,4-Toluene Diisocyanate | Yes | Yes | Yes |

15. REGULATORY INFORMATION (Continued)

U.S. REGULATIONS (continued):

U.S. SARA Reporting Requirements (continued):

| 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) |
|----------------------------------|---|--|--|
| 2,6-Toluene Diisocyanate | Yes | Yes | Yes |
| Proprietary Aromatic Hydrocarbon | No | No | Yes |

U.S. SARA 302 Extremely Hazardous Threshold Planning Quantity (TPQ): 2,4-Toluene Diisocyanate: 100 lb (45.4 kg); 2,6-Toluene Diisocyanate: 100 lb (45.4 kg)

U.S. SARA 304 Extremely Hazardous Reportable Quantity (RQ): 2,4-Toluene Diisocyanate: 100 lb (45.4 kg); 2,6-Toluene Diisocyanate: 100 lb (45.4 kg)

U.S. CERCLA Reportable Quantity (RQ): 2,4-Toluene Diisocyanate = 100 lb (45.4 kg); 2,6-Toluene Diisocyanate = 100 lb (45.4 kg); Ethyl Benzene = 1000 (454 kg); Toluene = 1000 lb (454 kg); Proprietary Aromatic Hydrocarbon = 100 lb (45.4 kg). As a glycol ether compound, the Propylene Glycol Monomethyl Ether Acetate component is a CERCLA Hazardous Material, although it has no specific reportable quantity.

U.S. SARA Hazard Categories (Section 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; 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. Clean Air Act (CA 112r) Threshold Quantity (TQ): The 2,4-Toluene Diisocyanate and Proprietary Aromatic Hydrocarbon components are listed as Hazardous Air Pollutants (HAPs) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance-based standards for all air emission sources that emit one or more of the listed pollutants. These chemicals are included on this list.

U.S. Clean Water Act Requirements:

Clean Water Act Requirements § 311: The following components are designated as Hazardous Substances under Section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978 (includes any isomers and hydrates, as well as any solutions and mixtures containing these substances): Toluene, Proprietary Aromatic Hydrocarbon. These regulations apply to discharges of this substance.

Clean Water Act Requirements § 307: The following components are designated as Toxic Pollutants pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and are subject to effluent limitations. Toluene, Proprietary Aromatic Hydrocarbon.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): The Ethyl Benzene and Toluene components are on the California Proposition 65 lists. WARNING: This product contains chemicals known to the State of California to cause developmental harm. This product may expose you to chemicals including Ethyl Benzene and Toluene, which are known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to P65Warnings.ca.gov. In addition, to the warning text provided above, the following symbol must be displayed. Where the sign, label or shelf tag for the product is not printed using the color yellow, the symbol may be printed in black and white. The symbol shall be placed to the left of the text of the warning, in a size no smaller than the height of the word "WARNING".



CANADIAN REGULATIONS:

Canadian DSL/NDL Inventory Status: The components of this product which have a CAS# given in Section 2 (Composition and Information on Ingredients) are listed on the DSL Inventory.

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists: The Proprietary Aromatic Hydrocarbon and Toluene components are on the CEPA Priority Substances 1 list, not considered as "TOXIC" under Section 64 of CEPA.

Ethyl Benzene is a Substances with Greatest Potential For Human Exposure Substance on Environment Canada/Health Canada Pilot Project List (CEPA 1999, Section 73). Meets the categorization criteria: *may present, to individuals in Canada, the greatest potential for exposure; or *are persistent or bio-accumulative in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

Canadian WHMIS (HPR-GHS) 2015 Classification and Symbols: See Section 16 for in Classification and Symbols under HPR-GHS 2015.

16. OTHER INFORMATION

GLOBAL HARMONIZATION SYSTEM CLASSIFICATION:

Classification: Flammable Liquid Category 2, Carcinogenic Category 2, Reproductive Toxicity Category 2, Acute Inhalation Toxicity Category 2, Aspiration Hazard Category 1, Specific Target Organ Toxicity Repeated Exposure Category 2, 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, Specific Target Organ Toxicity (Inhalation-Central Nervous System) Single Exposure Category 3, Aquatic Chronic Toxicity Category 3

Signal Word: Danger

Hazard Statements: H225 Highly flammable liquid and vapor. H351: Suspected of causing cancer. H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H330: Fatal if inhaled. H304: May be fatal if swallowed and enters airways. H319: Causes serious eye irritation. H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H335: May cause respiratory irritation. H336: May cause drowsiness or dizziness. H317: May cause an allergic skin reaction. H373: May cause damage to organs through prolonged or repeated exposure. 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. 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. P260: Do not breathe mist/vapors/spray. 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.

16. OTHER INFORMATION (Continued)

GLOBAL HARMONIZATION SYSTEM CLASSIFICATION (continued):

Precautionary Statements (continued):

Response: 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. P308 + P313: IF exposed or concerned: Get medical advice/attention. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting. P304 + P340 + P310: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. 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. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P320: Specific treatment is urgent.

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.

Hazard Symbols/Pictograms: GHS02, GHS05, 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: July 2018: Review and up-date entire SDS for current regulations, data and format.

DATE OF PRINTING

July 24, 2018

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 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.

DFG MAK Germ Cell Mutagen Categories (continued): 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 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 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. **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 a there is a danger of cutaneous absorption.

STEL: 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-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 LD₅₀ Rat:* > 5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ 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 LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 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 LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 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 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 LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L. 4 **Severe Hazard:** Life-threatening; major or permanent damage may result from single or repeated exposure; 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 LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 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.). 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 course 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).

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 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:** Packaging 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 explosion hazard. **Compressed Gases:** Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. **Pyrophorics:** No Rating. **Oxidizers:** Packaging 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 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. 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 LC₅₀ for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 10,000 ppm. 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 LD₅₀ 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 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 LC₅₀ 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 LC₅₀ for acute inhalation toxicity, if its LC₅₀ 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 LC₅₀ for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LD₅₀ 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 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 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 LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4.

HEALTH HAZARD (continued): 3 (continued): Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials with an LD₅₀ 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 LD₅₀ 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 LC₅₀ 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 LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ 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 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) or above 10 W/mL and below 100 W/mL. **2** 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) or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **3** 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.

DEFINITIONS OF TERMS (Continued)

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. 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. TDL₀: Lowest dose to cause a symptom. TCL₀: Lowest concentration to cause a symptom. TD₀, LDL₀, and LD₀, or TC, TC₀, LCL₀, and LCO: 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 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_{OW} or log K_{OC}: 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/NDL: Canadian Domestic/Non-Domestic Substances List.