

# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, and Canadian WHMIS standards

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

### 1. PRODUCT IDENTIFICATION

<u>TRADE NAME (AS LABELED):</u>	<b>OETECH PIT RESIN</b>
<u>PRODUCT CODE:</u>	OETPITRESIN
<u>CHEMICAL NAME/CLASS:</u>	Mixture of Acrylic Acid & Acrylate Compounds
<u>PRODUCT USE:</u>	Windshield Pit Repair
<u>U.N. NUMBER:</u>	Not Applicable
<u>U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:</u>	Not Applicable
<u>U.S./DISTRIBUTOR'S NAME:</u>	<b>Pilkington North America</b>
<u>ADDRESS:</u>	3440 Centerpoint Drive Grove City, OH 43123 (419) 247 3731
<u>U.S. BUSINESS PHONE:</u>	(800) 255 3924 (in transport)
<u>U.S. EMERGENCY PHONE:</u>	(800) 424 9300 (in use)
<u>MEXICO DISTRIBUTOR'S NAME:</u>	<b>Pilkington Mexico</b>
<u>ADDRESS:</u>	Calzada de la Naranja No. 154 Naucalpan, Estado de México 53370 MEXICO 011 52 55 5357 0574
<u>BUSINESS NUMBER:</u>	011 52 55 5357 0574
<u>EMERGENCY NUMBER:</u>	011 52 55 5357 0574
<u>DATE OF PREPARATION:</u>	January 28, 2010

### 2. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW: Product Description:** This product is a clear, colorless liquid with an acrylic odor. **Health Hazards:** This product can cause moderate irritation to contaminated tissue, and may cause tissue damage upon prolonged exposure. Inhalation of high concentrations of vapors can cause central nervous system depression (e.g., dizziness, headaches, and nausea). Skin contact may cause sensitization and allergic reaction in susceptible individuals. **Flammability Hazards:** This product must be substantially preheated before ignition to occur. In the event of a fire, the components of this product may decompose to release irritating vapors and toxic gases (e.g., silicon compounds, carbon dioxide, and carbon monoxide). **Reactivity Hazards:** In the event this material is exposed to extremely high temperatures or incompatible chemicals, uncontrolled polymerization may occur. **Environmental Hazards:** If this product is accidentally released to the environment, harm to animals and plants may occur. **Emergency Response Procedures:** Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

### 3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS #	% w/v
Acrylamidoethyl Cellulose Acetate	91313-01-8	Unlisted	3-7%
Acrylic Acid	79-10-7	201-177-9	3-7%
1-Hydroxycyclohexyl Phenyl Ketone	947-19-3	213-426-9	3-7%
2-Hydroxyethyl Methacrylate	868-77-9	212-782-2	15-40%
Isobornyl Acrylate	5888-33-5	227-561-8	10-30%
Aliphatic Urethane Acrylate Oligomer	Proprietary		30-40%
Other components which are present in less than 1 percent concentration (or 0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).			Balance

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

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### 4. FIRST-AID MEASURES

Contaminated individuals should be taken for medical attention if they feel unwell or if adverse effects occur. Take copy of label and MSDS to physician or health professional with contaminated individual.

**SKIN EXPOSURE:** If this material contaminates the skin, begin decontamination with running water. Recommended flushing is for 15 minutes if any sign of skin irritation develops. Contaminated individual should seek immediate medical attention if any adverse exposure symptoms develop.

**EYE EXPOSURE:** If this product enters the eyes, open contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have contaminated individual "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing. Contaminated individual must seek medical attention if any adverse effect occurs.

**INHALATION:** If this product is inhaled, remove contaminated individual to fresh air. If adverse effect occurs, seek medical attention.

**INGESTION:** If this material is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Skin disorders, respiratory conditions, and central nervous system conditions may be aggravated by prolonged overexposure to this product.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.

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### 5. FIRE-FIGHTING MEASURES

**FLASH POINT (calculated):** > 93.3°C (> 200°F)

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower: Not applicable.

Upper: Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Use extinguishing material suitable to the surrounding fire.

Water Spray: YES

Carbon Dioxide: YES

Foam: YES

Dry Chemical: YES

Halon: YES

Other: Any "ABC" Class

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** This product presents a moderate eye and skin-contact hazard to firefighters. This material must be substantially preheated before ignition to occur. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (including nitrogen oxides, carbon dioxide, and carbon monoxide). Under fire conditions, uncontrolled polymerization of this product may occur and result in rupture of sealed containers.

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: Not applicable.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if it can be done without risk to personnel. Water spray can be used to cool fire-exposed containers. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. Rinse contaminated equipment thoroughly with soapy water before returning such equipment to service.

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### 6. ACCIDENTAL RELEASE MEASURES

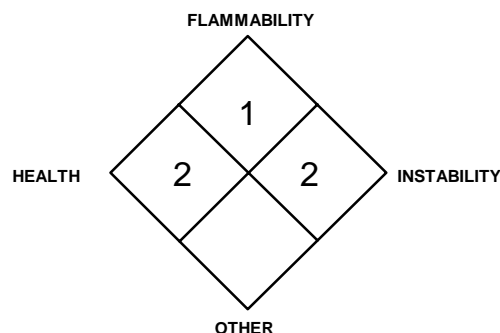
**SPILL AND LEAK RESPONSE:** Proper protective equipment should be used. In the event of a spill, clear the area and protect people. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment) if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA).

**Small Spills:** Wear rubber gloves, splash goggles, and appropriate body protection. Wipe up spilled paste with polypads or other suitable absorbent materials. Wash contaminated area with soap and water, absorb with paper towels, and rinse with water.

**Large Spills:** Trained personnel following pre-planned procedures should handle non-incident releases. 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 and boots, hard hat, and Self-Contained Breathing Apparatus.** Wipe up

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#### NFPA RATING



Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate  
3 = Serious 4 = Severe

spilled paste with polypads or other suitable absorbent materials. Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Monitor area and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

Place all spill residue in an appropriate container and seal. Decontaminate the area thoroughly. If necessary, discard all stained response equipment or rinse with soapy water before returning such equipment to service. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements.

## **PART III** *How can I prevent hazardous situations from occurring?*

### **7. HANDLING and STORAGE**

**WORK AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. 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. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Empty containers may contain residual liquid; therefore, empty containers should be handled with care.

**SPECIFIC USE(S):** This product is used for vehicle windshield repair. Follow all industry standards for use of this product.

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely, if necessary. Collect all rinsates and dispose of according to applicable international, U.S. Federal, State, or local procedures and appropriate standards of Canada.

### **8. EXPOSURE CONTROLS - PERSONAL PROTECTION**

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation. Use a mechanical fan or vent area to outside. Where appropriate, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Ensure eyewash/safety shower stations are available near areas where this product is used.

#### **EXPOSURE LIMITS:**

CHEMICAL NAME	CAS #	Proportion	EXPOSURE LIMITS IN AIR								
			ACGIH-TLV		OSHA-PEL		NIOSH			OTHER	
			TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	IDLH mg/m <sup>3</sup>		mg/m <sup>3</sup>
Acrylamido Cellulose Acetate	91313-01-8	1-10%	NE	NE	NE	NE	NE	NE	NE	NE	NE
Acrylic Acid	79-10-7	<5%	5.9 (skin)	NE	30 (skin) [vacated 1989 PEL]	NE	6 (skin)	NE	NE	NE	Carcinogen: IARC-3, TLV-A4
1-Hydroxycyclohexyl Phenyl Ketone	947-19-3	1-7%	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-Hydroxyethyl Methacrylate	868-77-9	20-30%	NE	NE	NE	NE	NE	NE	NE	NE	DFG MAK: Danger of sensitization of the skin.
Isobornyl Acrylate	5888-33-5	20-32%	NE	NE	NE	NE	NE	NE	NE	NE	NE
Aliphatic Methacrylate Oligomer	Proprietary	30-40%	NE	NE	NE	NE	NE	NE	NE	NE	NE
Other components which are present in less than 1 percent concentration (or 0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance	None of the other components of this product contribute significant, additional, hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian Workplace Hazardous Materials Identification System Standards (CPR 4) and European Community Standards (Commission Directive 93/112/EEC).								

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format.

**INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS:** Currently, the following international exposure limits are established for the components of this product:

**ACRYLIC ACID:**

Australia: TWA = 10 ppm (30 mg/m<sup>3</sup>), JAN 1993  
Belgium: TWA = 10 ppm (29 mg/m<sup>3</sup>), JAN 1993  
Denmark: TWA = 2 ppm (5.9 mg/m<sup>3</sup>), Skin, JAN 1999  
France: VME = 10 ppm (30 mg/m<sup>3</sup>), JAN 1999  
Germany: MAK Cannot Be Established, JAN 1999  
Norway: TWA = 10 ppm (30 mg/m<sup>3</sup>), JAN 1999  
Russia: STEL = 5 mg/m<sup>3</sup>, JAN 1993  
The Netherlands: MAC-TGG = 5.9 mg/m<sup>3</sup>, 2003  
Switzerland: MAK-W = 0.03 mg/m<sup>3</sup>, Skin, Carcinogen, JAN 1999  
United Kingdom: TWA = 10 ppm (30 mg/m<sup>3</sup>), STEL = 20 ppm (60 mg/m<sup>3</sup>), SEP 2000  
In Argentina, Bulgaria, Colombia, Jordan, Korea, New Zealand, Singapore, Vietnam, New Zealand, Singapore, Vietnam check ACGIH TLV

**2-HYDROXYETHYL METHACRYLATE:**

Russia: STEL = 20 mg/m<sup>3</sup>, JAN 1993  
The Netherlands: MAC-TGG = 0.24 mg/m<sup>3</sup>, 2003

*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) or equivalent standard of Canada. Please reference applicable regulations and standards for relevant details.*

**RESPIRATORY PROTECTION:** Maintain airborne contaminant concentrations below guidelines listed in this section, if applicable. If respiratory protection is needed, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, or Canadian CSA Standard Z94.4-93. 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 OSHA's Respiratory Protection Standard (1910.134-1998).

**EYE PROTECTION:** For situations in which excessive splashes or sprays may be generated, wear chemical splash goggles, or regular splash goggles. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or Canadian Standards.

**HAND PROTECTION:** For situations in which prolonged skin contact is anticipated, double glove, using latex, nitrile, or rubber gloves. Check gloves for leaks. Wash hands before putting on gloves and after removing gloves. Gloves should cover the gown cuff. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate standards of Canada.

**BODY PROTECTION:** None normally needed under typical circumstances of use. If necessary, use body protection appropriate for task (e.g., Tyvek suit, rubber apron). If necessary, refer appropriate Standards of Canada, the European Standard CEN/TR 15419:2006 for further information. 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 protection as described in U.S. OSHA 29 CFR 1910.136 Canadian CSA Standard Z195-M1984, *Protective Footwear*.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

**RELATIVE VAPOR DENSITY (air = 1):** > 1.0

**SPECIFIC GRAVITY (water = 1):** 1.08

**SOLUBILITY IN WATER:** Slightly soluble.

**VAPOR PRESSURE, mm Hg:** 6

**ODOR THRESHOLD:** Not established.

**COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT):** Not established.

**APPEARANCE AND COLOR:** A clear, colorless liquid with an acrylic odor.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** The odor is a distinguishing characteristic of this product.

**EVAPORATION RATE (nBuAc = 1):** < 1.0

**MELTING/FREEZING POINT:** Not established.

**BOILING POINT:** Not established.

**pH:** Not established.

**% VOLATILE:** < 1

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## 10. STABILITY and REACTIVITY

**STABILITY:** Stable under typical, environmental conditions in a workplace in the absence of contaminants. Polymerization can occur under conditions described below.

**DECOMPOSITION PRODUCTS:** The products of thermal decomposition of this material include irritating vapors and toxic gases (e.g., nitrogen oxides, carbon dioxide, carbon monoxide).

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Strong oxidizers, strong acids, strong bases. Components of this product can also polymerize when in contact with copper, copper alloys, iron, rust, and steel.

**HAZARDOUS POLYMERIZATION:** When exposed to ultraviolet light, in contact with heat, or if contaminated with incompatible chemicals, hazardous polymerization can occur. Uncontrolled polymerization may cause rapid evolution of heat and increased pressure that could result in rupture of sealed containers.

**CONDITIONS TO AVOID:** Exposure to water, moist air, and ultraviolet light, incompatible chemicals, high temperatures.

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

### 11. TOXICOLOGICAL INFORMATION

**SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:** The most significant routes of occupational overexposure are inhalation of vapors and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

**INHALATION:** If mists or vapors of this product are inhaled, they can irritate the nose and other tissues of the upper respiratory system.

**CONTACT WITH SKIN OR EYES:** Eye contact can cause pain, irritation and reddening. Prolonged eye contact can result in tissue damage (which may be permanent and can result in blindness). Skin contact can cause reddening, discomfort, and irritation. Skin contact can cause sensitization (i.e., the development of allergy-like skin reactions, including rashes and hives) in susceptible individuals. Once sensitized, subsequent contact with very small amounts can cause allergic reaction.

**SKIN ABSORPTION:** Skin absorption is not an expected potential route of exposure to this product.

**INGESTION:** Ingestion is not anticipated to be a likely route of exposure to this product. If this material is swallowed, it may cause headache, nausea, and vomiting. Refer to "Other Potential Health Effects" for additional information.

**INJECTION:** Though not anticipated to be a likely route of occupational exposure, injection of this material (via puncture or laceration by a contaminated object) can cause local reddening, tissue swelling, and discomfort in addition to the wound. Refer to "Other Potential Health Effects" for additional information.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE:** An Explanation in [Lay Terms](#).

**ACUTE:** This material moderately irritates the eyes, skin, and mucous membranes. Prolonged contact can result in tissue damage of the contaminated area.

**CHRONIC:** Repeated skin contact can cause the development of allergy-like skin reactions (e.g., hives, rashes) and dermatitis (inflammation of the skin, resulting in redness and dryness). See Section 11 (Toxicology Information) for additional information on the components of this product.

**TARGET ORGANS:** Skin, eyes, respiratory system, optic nerves, central nervous system, kidneys, liver.

**TOXICITY DATA:** The specific toxicology data available for the components of this product present in greater than 1 percent concentration are presented below:

**ACRYLIC ACID:**

Open Irritation Test (Skin-Rat) 500 mg: Severe  
 Standard Draize Test (Skin-Rabbit) 5 mg/24 hours: Severe  
 Standard Draize Test (Eye-Rabbit) 1 mg: Severe  
 Standard Draize Test (Eye-Rabbit) 250 µg/24 hours: Severe  
 LD<sub>50</sub> (Oral-Rat) 33,500 µg/kg  
 LD<sub>50</sub> (Oral-Mouse) 2400 mg/kg: Tumorigenic: active as anti-cancer agent  
 LD<sub>50</sub> (Intraperitoneal-Rat) 22 mg/kg  
 LD<sub>50</sub> (Intraperitoneal-Mouse) 144 mg/kg  
 LD<sub>50</sub> (Skin-Rabbit) 280 µL/kg  
 LD<sub>50</sub> (Subcutaneous-Mouse) 1590 mg/kg  
 LD<sub>50</sub> (Unreported-Rat) 1250 mg/kg  
 LD<sub>50</sub> (Unreported-Mouse) 830 mg/kg  
 LD<sub>50</sub> (Unreported-Rabbit) 250 mg/kg  
 LCLo (Inhalation-Rat) 4000 ppm/4 hours  
 LC<sub>50</sub> (Inhalation-Mouse) 5300 mg/m<sup>3</sup>/2 hours  
 LC (Inhalation-Monkey) > 75 ppm/6 hours: Sense Organs and Special Senses (Olfaction): deviated nasal septum, ulcerated nasal septum  
 TCLo (Inhalation-Rat) 223 ppm/6 hours/2 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Nutritional and Gross

Metabolic: weight loss or decreased weight gain  
 TCLo (Inhalation-Rat) 75 ppm/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified  
 TCLo (Inhalation-Rat) 225 ppm/6 hours/10 days-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
 TCLo (Inhalation-Mouse) 223 ppm/6 hours/2 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
 TCLo (Inhalation-Mouse) 25 ppm/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Nutritional and Gross Metabolic: weight loss or decreased weight gain

**ACRYLIC ACID (continued):**

TCLo (Inhalation-Mouse) 225 ppm/6 hours/10 days-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Behavioral: muscle contraction or spasticity; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
 TDLo (Oral-Rat) 22,500 mg/kg/90 days-continuous: Behavioral: fluid intake; Kidney, Ureter, Bladder: changes in bladder weight; Related to Chronic Data: changes in testicular weight  
 TDLo (Skin-Guinea Pig) 5 pph/12 weeks-intermittent: Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)  
 TDLo (Skin-Mouse) 37,440 mg/kg/78 weeks-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Blood: leukemia  
 TDLo (Oral-Rat) 169 gm/kg: male 13 week(s) pre-mating; female 13 week(s) pre-mating: 3 week(s) post-birth: Reproductive: Paternal Effects: testes, epididymis, sperm duct; Effects on Newborn: growth statistics (e.g.%, reduced weight gain), physical  
 TDLo (Oral-Rat) 43,680 mg/kg: Multigeneration: Reproductive: Maternal Effects: other effects;



**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

<b>HEALTH HAZARD</b>	(BLUE)	2*
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<b>FLAMMABILITY HAZARD</b>	(RED)	1
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<b>PHYSICAL HAZARD</b>	(YELLOW)	2
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**PROTECTIVE EQUIPMENT**

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate  
 3 = Serious 4 = Severe \* = Chronic hazard

Effects on Newborn: growth statistics (e.g.%, reduced weight gain)  
TDLo (Subcutaneous-Mouse) 2912 mg/kg/52 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria, tumors at site of application  
TDLo (Intraperitoneal-Rat) 14,340 µg/kg: female 5-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: other developmental abnormalities  
TDLo (Intraperitoneal-Rat) 7329 µg/kg: female 5-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: musculoskeletal system  
TD (Skin-Mouse) 37,440 mg/kg/78 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Skin and Appendages: tumors  
TCLo (Inhalation-Rat) 300 ppm: female 6-20 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Maternal Effects: other effects  
Cytogenetic Analysis (Mouse-Lymphocyte) 450 mg/L

**ACRYLIC ACID (continued):**  
Cytogenetic Analysis (Hamster-Ovary) 116 mg/L  
Mutation in Mammalian Somatic Cells (Mouse-Lymphocyte) 500 mg/L  
**ACRYLAMIDOETHYL CELLULOSE ACETATE:**  
Currently, there are no toxicological data for this compound.  
**2-HYDROXYETHYL METHACRYLATE:**  
LD<sub>50</sub> (Oral-Rat) 5050 mg/kg: Behavioral: coma  
LD<sub>50</sub> (Oral-Mouse) 3275 mg/kg: Behavioral: coma  
LD<sub>50</sub> (Oral-Guinea Pig) 4680 mg/kg: Behavioral: coma  
LD<sub>50</sub> (Intraperitoneal-Rat) 1250 mg/kg  
LD<sub>50</sub> (Intraperitoneal-Mouse) 497 mg/kg  
LDLo (Intravenous-Dog) 99,200 nL/kg  
LD<sub>50</sub> (Intraperitoneal-Mouse) 497 mg/kg  
LDLo (Intravenous-Dog) 99,200 nL/kg  
TDLo (Oral-Rat) 612 mg/kg/35 weeks-intermittent: Liver: other changes; Blood: changes in spleen  
TDLo (Oral-Rat) 2850 mg/kg/30 days-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Blood: changes in leukocyte (WBC) count; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other transferases

TDLo (Oral-Rat) 3062 mg/kg: female 35 week(s) pre-mating: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Effects on Embryo or Fetus: fetal death  
TDLo (Oral-Rat) 3062 mg/kg: male 35 week(s) pre-mating: Reproductive: Fertility: pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death  
Cytogenetic Analysis (Hamster-Lung) 10 mmol/L/6 hours  
**ISOBORNYL ACRYLATE:**  
Standard Draize Test (Skin-Rabbit) 500 µL: Moderate  
Standard Draize Test (Eye-Rabbit) 100 µL: Mild  
LD<sub>50</sub> (Oral-Rat) 4890 mg/kg: Behavioral: tremor; Lungs, Thorax, or Respiration: dyspnea; Skin and Appendages: hair  
LD<sub>50</sub> (Skin-Rabbit) > 5 gm/kg

**CARCINOGENIC POTENTIAL OF COMPONENTS:** The components of this product listed in Section 3 (Composition and Information on Ingredients) are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

**ACRYLIC ACID:** ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

The remaining components are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA, and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

**IRRITANCY OF PRODUCT:** This product can be moderately to severely irritating to contaminated eyes, skin and mucous membranes, depending on the duration of overexposure.

**SENSITIZATION TO THE PRODUCT:** Skin contact can cause sensitization (i.e., the development of allergy-like skin reactions, including rashes and hives) in susceptible individuals.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of this product and its components on the human reproductive system.

**Mutagenicity:** The components of this product are **not** reported to produce mutagenic effects in humans.

**Embryotoxicity:** The components of this product are **not** reported to produce embryotoxic effects in humans.

**Teratogenicity:** The components of this product are **not** reported to cause teratogenic effects in humans.

**Reproductive Toxicity:** The components of this product are **not** reported to cause reproductive effects in humans.

**REPRODUCTIVE TOXICITY INFORMATION (continued):** A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An *embryotoxin* is a chemical which 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 which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

**BIOLOGICAL EXPOSURES INDICES (BEIs):** Currently, there are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

**MOBILITY:** This product has not been tested for mobility in soil. Acrylate compounds will decompose over time in the environment.

### ACRYLIC ACID:

Terrestrial Fate: Based on a classification scheme, a Koc value of 43 indicates that Acrylic Acid is expected to have very high mobility in soil. Volatilization of Acrylic Acid from moist soil surfaces is not expected to be an important fate process given a Henry's Law constant of  $3.2 \times 10^{-7}$  atm-cu m/mole. Acrylic Acid has a pKa of 4.25, and at environmental conditions of pH 5-9, should exist predominantly in the anionic form. This may result in greater adsorption and less mobility of Acrylic Acid in soil. The potential for volatilization of Acrylic Acid from dry soil surfaces may exist based upon a vapor pressure of 3.97 mmHg. A microbial degradation study of Acrylic Acid in soil indicated that acrylic acid, formed from hydrolysis of acrylamide added to soil, was totally degraded within 15 days of its formation.

### 2-HYDROXYETHYL METHACRYLATE:

Terrestrial Fate: Based on a classification scheme, an estimated Koc value of 43, determined from a log Kow of 0.47 and a regression-derived equation, indicates that 2-Hydroxyethyl Methacrylate is expected to have very high mobility in soil. Volatilization of 2-Hydroxyethyl Methacrylate from moist soil surfaces is not expected to be an important fate process given an estimated Henry's Law constant of  $4.6 \times 10^{-9}$  atm-cu m/mole, using a fragment constant estimation method. 2-Hydroxyethyl Methacrylate is not expected to volatilize from dry soil surfaces based upon a vapor pressure of 0.126 mm Hg. Screening tests indicate that 2-Hydroxyethyl Methacrylate is readily biodegradable; it reached 92-100% of its theoretical BOD in 2 weeks using an activated sludge inoculum.

**PERSISTENCE AND BIODEGRADABILITY:** This product has not been tested for persistence or biodegradability. Acrylate compounds will decompose over time in the environment.

### ACRYLIC ACID:

Persistence and Biodegradability: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, Acrylic Acid, which has a vapor pressure of 3.97 mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase Acrylic Acid is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 2 days from its estimated rate constant of  $9.7 \times 10^{-12}$  cu cm/molecule-sec at 25°C. A major removal process of Acrylic Acid from the atmosphere is reaction with hydroxyl radicals; the atmospheric lifetime was reported to be < 1 day. The rate constant for the vapor-phase reaction of acrylic with ozone has been estimated as  $1.8 \times 10^{-18}$  cu cm/molecule-sec at 25°C using a structure estimation method; this corresponds to an atmospheric half-life of about 7 days at an atmospheric concentration of  $7 \times 10^{+11}$  molecules/cu cm. Acrylic Acid is not expected to directly photolyze in sunlight based upon the lack of absorption of light at wavelengths > 290 nm by the structurally similar ethyl acrylate. Based on a classification scheme, a Koc value of 43 indicates that Acrylic Acid is not expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is expected to be slow based upon a Henry's Law constant of  $3.2 \times 10^{-7}$  atm-cu m/mole. Volatilization half-lives for a model river and model lake are 96 days and 700 days, respectively, using an estimation method. A pKa of 4.25 indicates Acrylic Acid will exist almost entirely in the anionic form at pH values of 5 to 9 and therefore volatilization from water surfaces is not expected to be an important fate process. Acrylic Acid was determined to be stable to hydrolysis at pH 3, 7, and 11. According to a classification scheme, an estimated BCF of 1, from a log Kow of 0.35 suggests the potential for bioconcentration in aquatic organisms is low. Acrylic Acid readily biodegrades both aerobically and anaerobically; it reached 68% of its theoretical BOD in 2 weeks using an activated sludge inoculum and in a 42 day anaerobic screening study using a sewage seed inoculum, 71% of acrylic acid was mineralized.

### 2-HYDROXYETHYL METHACRYLATE:

Persistence and Biodegradability: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, 2-Hydroxyethyl Methacrylate, which has a vapor pressure of 0.126 mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase 2-Hydroxyethyl Methacrylate is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 16 hours from its estimated rate constant of  $2.4 \times 10^{-11}$  cu cm/molecule-sec at 25°C. Because the structurally similar ethyl methacrylate does not absorb light in the environmental spectrum above 290 nm, direct photolysis of 2-Hydroxyethyl Methacrylate is not expected to occur. Based on a classification scheme, an estimated Koc value of 43, determined from a log Kow of 0.47 and a regression-derived equation, indicates that 2-Hydroxyethyl Methacrylate is not expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is not expected based upon an estimated Henry's Law constant of  $4.6 \times 10^{-9}$  atm-cu m/mole, developed using a fragment constant estimation method. According to a classification scheme, an estimated BCF of 1.3, from the log Kow, suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis of 2-Hydroxyethyl Methacrylate may be a significant process under basic conditions based upon a hydrolytic half-life of 4 hours at pH 11 for the structurally similar butyl acrylate; half-lives for butyl acrylate at pH 7, 8, and 9 were 4 years, 150 days, and 15 days, respectively, based upon a hydrolytic rate constant of 0.053 L/mole-sec. Screening tests indicate that 2-Hydroxyethyl Methacrylate is readily biodegradable; it reached 92-100% of its theoretical BOD in 2 weeks using an activated sludge inoculum.

**BIO-ACCUMULATION POTENTIAL:** This product has not been tested for bio-accumulation potential. No information is available for components. The following is information for the possible decomposition product, Methanol.

### ACRYLIC ACID:

Bioconcentration: An estimated BCF of 1 was calculated for acrylic acid, using a log Kow of 0.35 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

### 2-HYDROXYETHYL METHACRYLATE:

Bioconcentration: An estimated BCF of 1.3 was calculated for 2-hydroxyethyl methacrylate, using a log Kow of 0.47. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

**EFFECT OF MATERIAL ON PLANTS OR ANIMALS:** This product may be harmful to contaminated terrestrial plants and animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** This product may have significant, adverse effects on aquatic plants and animals if accidentally released to an aquatic environment. The following are aquatic toxic data for some components of this product.

### ACRYLIC ACID:

Toxicity threshold (cell multiplication inhibition test): (*Pseudomonas putida* bacteria) 41 mg/L

Toxicity threshold (cell multiplication inhibition test): (*Microcystis aeruginosa* algae) 0.15 mg/L

Toxicity threshold (cell multiplication inhibition test): (*Scenedesmus quadricauda* green algae) 18 mg/L

Toxicity threshold (cell multiplication inhibition test): (*Entosiphon sulcatum* protozoa) 20 mg/L

### ACRYLIC ACID (continued):

Toxicity threshold (cell multiplication inhibition test): (*Uronema parducci* Chatton-Lwoff protozoa) 11 mg/L

EC<sub>0</sub> (*Daphnia magna*) [neutralized] 24 hours = 175 mg/L

EC<sub>50</sub> (*Daphnia magna*) [neutralized] 24 hours = 765 mg/L

EC<sub>100</sub> (*Daphnia magna*) [neutralized] 24 hours = 5,000 mg/L

EC<sub>0</sub> (*Daphnia magna*) 24 hours = 51 mg/L

EC<sub>50</sub> (*Daphnia magna*) 24 hours = 54 mg/L

EC<sub>100</sub> (*Daphnia magna*) 24 hours = 91 mg/L

**ACRYLIC ACID (continued):**LC<sub>0</sub> (*Leuciscus idus*) 48 hours = 210 mg/L

LC<sub>50</sub> (*Leuciscus idus*) 48 hours = 315 mg/L

LC<sub>0</sub> (*Leuciscus idus*) 48 hours = 420 mg/L

### 2-HYDROXYETHYL METHACRYLATE:

LC<sub>50</sub> (*Pimephales promelas* fathead minnows) 96 hours = 0.99 g/L (95% confidence limit 0.90-1.1 g/l); age 30 days old, water hardness 45.6 mg/l calcium carbonate, temp 24.9°C, pH 7.66, dissolved oxygen 7.1 mg/l, alkalinity 44.4 mg/l (CaCO<sub>3</sub>), Tank vol: 2.0 l, additions: 18 vol/day (flow-through bioassay)

### 13. DISPOSAL CONSIDERATIONS

**DISPOSAL METHODS:** It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

**DISPOSAL CONTAINERS:** Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

**PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING:** Wear proper protective equipment when handling waste materials.

**U.S. EPA WASTE NUMBER:** Not applicable.

### 14. TRANSPORTATION INFORMATION

**U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS:** This product is NOT classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

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

**INTERNATIONAL AIR TRANSPORT ASSOCIATION DESIGNATION:** This material is NOT considered as dangerous goods, per rules of IATA.

**INTERNATIONAL MARITIME ORGANIZATION (IMO):** This product is NOT considered as dangerous goods, per rules of the IMO, as follows:

### 15. REGULATORY INFORMATION

#### U.S. STATE AND FEDERAL 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, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Acrylic Acid	No	No	Yes

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Acrylic Acid = 5000 lb (2270 kg)

**U.S. TSCA INVENTORY STATUS:** The components of this product listed by CAS# in Section 3 (Composition and Information on Ingredients) are listed on the TSCA Inventory.

#### OTHER U.S. FEDERAL REGULATIONS:

##### ACRYLIC ACID:

Acrylic Acid is listed as a Hazardous Air Pollutant (HAP) 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. Acrylic Acid is included on this list.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this product is on the California Proposition 65 lists.

**U.S. ANSI STANDARD LABELING (Z129.1):** **WARNING!** CAUSES SKIN, EYE, AND RESPIRATORY SYSTEM IRRITATION. MAY BE HARMFUL OR FATAL IF SWALLOWED. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. MAY CAUSE ALLERGIC SKIN REACTIONS. WHEN HEATED, POLYMERIZATION MAY OCCUR AND RUPTURE CONTAINERS. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing vapor or mists. Avoid prolonged skin contact. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves and eye protection. Keep product away from strong bases, strong acids, and oxidizers. Keep container dry. Do not expose product to ultraviolet light. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If inhaled, remove to fresh air. If ingested, do not induce vomiting and get medical attention. Get medical attention if any adverse reaction occurs. **IN CASE OF FIRE:** Use water fog, dry chemical, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material and place in suitable container. Consult Material Safety Data Sheet for additional information.

#### ADDITIONAL CANADIAN REGULATIONS:

**CANADIAN DSL INVENTORY:** The components of this product listed by CAS # in Section 3 (Composition and Information on Ingredients) are listed on the DSL Inventory.

**CANADIAN WHMIS IDL DISCLOSURE STATUS:** The components of this product do not have disclosure levels.



OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITY SUBSTANCES LISTS: The components of this product are not on the Priority Substances Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Class D2B (Materials Causing Other Toxic Effects)



## 16. OTHER INFORMATION

**ORIGINALLY PREPARED BY:**

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## DEFINITION OF TERMS

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

**CAS #:** This is the Chemical Abstract Service Number that uniquely identifies each constituent.

**EXPOSURE LIMITS IN AIR:**

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

**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.

**MAK:** Federal Republic of Germany Maximum Concentration Values in the workplace.

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

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

**STEL-Short Term Exposure Limit:** 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:** 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.

**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. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD<sub>50</sub> Rat:* < 5000 mg/kg. *Dermal Toxicity LD<sub>50</sub>Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC<sub>50</sub> Rat:* < 20 mg/L.; **1 (Slight Hazard:** Minor reversible Injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD<sub>50</sub> Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD<sub>50</sub>Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 2-20 mg/L) **2 (Moderate Hazard:** Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD<sub>50</sub> Rat:* > 50-500 mg/kg. *Dermal Toxicity LD<sub>50</sub>Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 0.5-2 mg/L.)

**3 (Serious Hazard:** Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD<sub>50</sub> Rat:* > 1-50 mg/kg. *Dermal Toxicity LD<sub>50</sub>Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat:* > 0.05-0.5 mg/L.);

## HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS, continued:

### HEALTH HAZARD, continued:

**4** (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation*: Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation*: Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD<sub>50</sub> Rat*: ≤ 1 mg/kg. *Dermal Toxicity LD<sub>50</sub>Rat or Rabbit*: ≤ 20 mg/kg. *Inhalation Toxicity LC<sub>50</sub> 4-hrs Rat*: ≤ 0.05 mg/L).

### FLAMMABILITY HAZARD:

**0** (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1** (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, including: 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] (e.g. OSHA Class IIIB, or; 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 in air, including: 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; Solids and semisolids 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, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. 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]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: 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] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. 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. *Unstable Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No "0" rating allowed. *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. *Explosives*: Division 1.5 & 1.6 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; *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 explosive 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.

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

### PHYSICAL HAZARD (continued):

*Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II *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 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 1.2 – 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*: Packing Group I *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 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-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 to cause significant heat generation or explosion.).

### NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury).

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. **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. **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. **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. **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.

## DEFINITION OF TERMS (Continued):

## NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

**INSTABILITY HAZARD:** **0** Materials that in themselves are normally stable, even under fire conditions. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures.

### 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 vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

### 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. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. 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.

### ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL<sub>m</sub>** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K<sub>ow</sub>** or **log K<sub>oc</sub>** and is used to assess a substance's behavior in the environment.

## REGULATORY INFORMATION:

### U.S. and CANADA:

**ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.

### EUROPEAN:

**EU** is the European Union (formerly known as the **EEC**, European Economic Community). **EINECS:** This the European Inventory of Now-Existing Chemical Substances. The **ADR** is the European Agreement Concerning the International Carriage of Dangerous Goods by Road and the **RID** are the International Regulations Concerning the Carriage of Dangerous Goods by Rail. **AUSTRALIAN:** **AICS** is the Australian Inventory of Chemical Substances. **NOHSC:** NATIONAL OCCUPATIONAL HEALTH & SAFETY CODE.