

SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, European Union CLP EC 1272/2008, REACH and the Global Harmonization Standard

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY UNDERTAKING

IDENTIFICATION of the SUBSTANCE or PREPARATION:

TRADE NAME (AS LABELED):

PRODUCT CODE:

CHEMICAL NAME/CLASS:

PRODUCT USE:

U.N. NUMBER:

U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:

RELEVANT USES of the SUBSTANCE:

USES ADVISED AGAINST:

COMPANY/UNDERTAKING IDENTIFICATION:

U.S./DISTRIBUTOR'S NAME:

ADDRESS:

BUSINESS PHONE:

U.S. EMERGENCY PHONE:

EUROPEAN DISTRIBUTOR'S NAME:

ADDRESS:

BUSINESS NUMBER:

EMERGENCY NUMBER:

EMERGENCY NUMBER (in transport):

EMAIL ADDRESS FOR SDS INFORMATON:

DATE OF PREPARATION:

DATE OF REVISION:

SRP GENESIS PIT RESIN

1823

Mixture of acrylic acid and (meth)acrylate compounds

Windshield Repair

Not Applicable

Not Applicable

Vehicle Windshield Repair

Other than Relevant Use

SHAT-R-PROOF CORP.

650 Pelham Boulevard, Suite 100

St Paul, MN 55114

1-800-420-8036 (in use)

United States/Canada/Puerto Rico: 1-800/424-9300 (ChemTrec) [24-hrs]

International: 1-703-527-3887 (ChemTrec) [24-hours]

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April 24, 2005

January 27, 2015

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION, EU CLP REGULATION (EC) 1272/2008, OSHA HAZARD COMMUNICATION (GLOBAL HARMONIZATION), AND CANADIAN WHMIS LABELING AND CLASSIFICATION: This product has been classified per GHS Standards under European regulations, under OSHA's Hazard Communication Standard (29CFR §1910.1200), and Canadian WHMIS (HPR). This is a self-classification. For information on EU classification under (67/548/EEC), see below.

Hazard Statements: H315: Causes skin irritation. H319: Causes serious eye irritation. H335: May cause respiratory irritation. H317: May cause an allergic skin reaction.

Precautionary Statements:

Prevention: P261: Avoid breathing mists, sprays, fume. P264: Wash thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P272: Contaminated work clothing should not be allowed out of the workplace. P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response: P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. P337 + P313: If eye irritation persists: Get medical advice/attention. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs: Get medical advice/attention. P362: Take off contaminated clothing and wash it before reuse. P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms).

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

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

Hazard Symbols/Pictograms: GHS07



EU 67/548/EEC LABELING AND CLASSIFICATION: This product meets the classification of hazardous, as defined by the European Union Council Directive 67/548/EEC or subsequent Directives. This is a self-classification.

Classification: Irritant, Dangerous for the Environment

Risk Phrases: R36/37/38: Irritating to eyes, respiratory system and skin. R43: May cause sensitization by skin contact. R53: May cause long-term adverse effects in the aquatic environment

Safety Phrases: Safety Phrases: S2½: Keep locked-up and out of reach of children. (This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.) S26: In case of contact with the eyes, rinse immediately with plenty of water and seek immediate medical attention. S28: After contact with skin wash immediately with plenty of water. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S45: In case of accident or if you feel unwell seek medical advice immediately (show the label where possible). S61: Avoid release to the environment. Refer to special instructions/safety data sheet.

Hazard Symbols: Xi, N



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. Contact with water can generate methanol, a flammable liquid which can cause adverse effects in humans after overexposure. **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 or ELNICS #	W/W %	EU Classification (67/548/EEC) GHS & EU Classification (1272/2008) Risk Phrases/Hazard Statements
Aliphatic Urethane Acrylate Oligomer			15-40%	SELF CLASSIFICATION EU 67/548/EEC Classification: Irritant Risk Phrases: R36 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Eye Irritation Cat. 2A Hazard Statement Codes: H319 Hazard Symbols/Pictograms: GHS07
Isobornyl Acrylate	5888-33-5	227-561-6	15-40%	SELF CLASSIFICATION EU 67/548/EEC Classification: Irritant Risk Phrases: R36/37/38 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Respiratory Irritation) SE Cat. 3 Hazard Statement Codes: H315, H319, H335 Hazard Symbols/Pictograms: GHS07
2-Hydroxyethyl Methacrylate	868-77-9	212-782-2	15-40%	EU 67/548/EEC Classification: Irritant Risk Phrases: R36/38, R43 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Skin Irritation Cat. 2, Eye Irritation Cat. 2A, Skin Sensitization Cat. 1 Hazard Statement Codes: H315, H319, H317 Hazard Symbols/Pictograms: GHS07
Acrylic Acid	79-10-7	201-177-9	3-7%	EU 67/548/EEC Classification: Corrosive, Dangerous for the Environment Risk Phrases: R10, R20/21/22, R35, R50 Symbols: C, N GHS & EU CLP: 1272/2008: Classification: Flammable Liquid Cat. 2, Acute Inhalation Toxicity Cat. 4, Acute Dermal Toxicity Cat. 4, Acute Oral Toxicity Cat. 4, Skin Corrosion Cat. 1A, Aquatic Acute Toxicity Cat. 1, (STOT SE Cat. 3 if C ₂ ≥1% in mixture) Hazard Statement Codes: H226, H332, H312, H302, H314, H400, (H335) Hazard Symbols/Pictograms: GHS02, GHS05, GHS07, GHS09
1-Hydroxycyclohexyl phenyl Ketone	947-19-3	213-426-9	1-5%	SELF CLASSIFICATION EU 67/548/EEC Classification: Irritant Risk Phrases: R36 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Eye Irritation Cat. 2A Hazard Statement Codes: H319 Hazard Symbols/Pictograms: GHS07
Methacryloxypropyl Trimethoxysilane	2530-85-0	219-785-8	1-5%	SELF CLASSIFICATION EU 67/548/EEC Classification: Irritant Risk Phrases: R36/37/38 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Respiratory Irritation) SE Cat. 3 Hazard Statement Codes: H315, H319, H335 Hazard Symbols/Pictograms: GHS07

Chemical Name	CAS #	EINECS or ELNICS #	W/W %	EU Classification (67/548/EEC) GHS & EU Classification (1272/2008) Risk Phrases/Hazard Statements
Acrylamidoethyl Cellulose Acetate	91313-01-8	Not Listed	3-7%	SELF CLASSIFICATION EU 67/548/EEC Classification: Irritant Risk Phrases: R36/37/38 Symbols: Xi GHS & EU CLP: 1272/2008: Classification: Eye Irritation Cat. 2A Hazard Statement Codes: H319 Hazard Symbols/Pictograms: GHS07

4 FIRST-AID MEASURES

DESCRIPTION OF FIRST AID MEASURES: Contaminated individuals must be taken for medical attention if any adverse effects occur. Take a copy of label and SDS to health professional with victim.

SKIN EXPOSURE: If this product contaminates the skin, begin decontamination with running water. Minimum flushing is for 20 minutes. The contaminated individual must seek medical attention if any adverse effects occur after flushing.

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 20 minutes. Contaminated individual must seek medical attention if adverse effect continues after flushing.

INHALATION: If mists or sprays of this product are inhaled, remove victim to fresh air. The contaminated individual must seek medical attention if any adverse effects occur.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If victim is convulsing, maintain an open airway and obtain immediate medical attention.

MOST IMPORTANT SYMPTOMS/EFFECTS (ACUTE & CHRONIC): See Sections 2 (Hazard Identification) and 11 (Toxicological Information) for description of possible health effects from exposure to this product.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin disorders, respiratory conditions, and central nervous system conditions may be aggravated by prolonged overexposure to this product. Due to the generation of Methanol from components of this product, optic problems and liver and kidney disorders may be aggravated as well.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Treat symptoms and eliminate overexposure. If applicable, use the following guidelines for Methanol exposure:

The following information is from the "Toxicology of Commercial Chemical Products" (5th Edition, 1984): Ethyl alcohol, when consumed at the same time as methyl alcohol, prolongs the latent period before toxic symptoms appear. It has also been observed that some of the severe symptoms of methanol poisoning are alleviated by the ingestion of ethanol, and for this reason the recommended treatment includes the administration of ethanol by mouth, by stomach tube, and/or by intravenous infusion. A blood ethyl alcohol level of 0.1% is regarded as optimal. In extreme cases, ethanol may be given intravenously as a dilute solution in bicarbonate or saline. Other treatments include gastric lavage, administration of sodium bicarbonate (4 g every 15 minutes) for the treatment of acidosis, administration of oxygen, and hemodialysis. Due to Methanol's impact on the eyes, protect the patient's eyes.

5. FIRE-FIGHTING MEASURES

FLASH POINT (est.): > 93.3°C (> 200°F)

AUTOIGNITION TEMPERATURE: Not available.

FLAMMABLE LIMITS (in air by volume, %): Not available.

FIRE EXTINGUISHING MEDIA: Use extinguishing material suitable to the surrounding fire: halon, carbon dioxide, dry chemical and ABC class.

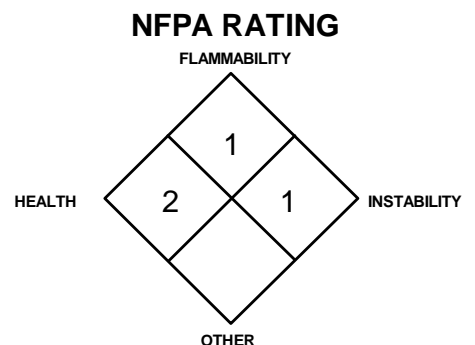
UNSUITABLE FIRE EXTINGUISHING MEDIA: Water should be used in flooding quantities or to cool containers only due to potential reaction, forming methanol. Only use foams appropriate for materials that react with water to form methanol.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE: 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 and carbon oxides). Under fire conditions, uncontrolled polymerization of this product may occur and result in rupture of sealed containers. Contact with water can generate Methanol, a flammable liquid which may be harmful to overexposed personnel.

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: Vapors may be sensitive to static discharge.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: 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.



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

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: 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).

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used. Use only non-sparking tools and equipment.

Small Spills: Wear rubber gloves, splash goggles, and appropriate body protection.

Large Spills: Not applicable due to small size of product packaging.

METHODS FOR CLEAN-UP AND CONTAINMENT: Avoid allowing contact with water on spilled substance or inside containers.

Small Spills: Absorb spilled material with polypads or other suitable, non-reacting sorbent, avoiding generation of aerosols, wearing gloves, goggles and apron. Place spilled material in appropriate container for disposal, sealing tightly. Remove all residue before decontamination of spill area.

Large Spills: Not applicable due to small size of product packaging.

All Spills: Place all spill residue in a double plastic bag or other containment and seal. Decontaminate the area thoroughly. 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.

ENVIRONMENTAL PRECAUTIONS: Avoid release to the environment. Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

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: All employees who handle this material should be trained to handle it safely. Keep container tightly closed when not in use. 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.

CONDITIONS FOR SAFE STORAGE: Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Empty containers may contain residual product; therefore, empty containers should be handled with care.

SPECIFIC END USE(S): This product is used for vehicle windscreen repair. 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. Use a mechanical fan or vent area to outside. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits provided in this section, if applicable. Use a non-sparking, grounded, explosion-proof ventilation system separate from other exhaust ventilation systems. Exhaust system in manner consistent with prevention of release to atmosphere. An eyewash and safety shower should be readily accessible.

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m	STEL mg/m	TWA mg/m ³	STEL mg/m	TWA mg/m	STEL mg/m	IDLH mg/m ³	
Acrylic Acid	79-10-7	5.9 (skin)	NE	30 (skin) [vacated 1989 PEL]	NE	6	10	NE	DFG MAKs: TWA = 30 PEAK = 1•MAK 15 min average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: C
Aliphatic Methacrylate Oligomer	Proprietar y	NE	NE	NE	NE	NE	NE	NE	NE
2-Hydroxyethyl Methacrylate	868-77-9	NE	NE	NE	NE	NE	NE	NE	DFG MAK: Danger of sensitization of the skin.
Isobornyl Acrylate	5888-33-5	NE	NE	NE	NE	NE	NE	NE	NE
Methacryloxypropyl Trimethoxysilane	2530-85-0	NE	NE	NE	NE	NE	NE	NE	NE
1-Hydroxycyclohexylphenyl Ketone	947-19-3	NE	NE	NE	NE	NE	NE	NE	NE

NE = Not Established.

See Section 16 for Definitions of Terms Used.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES (continued):

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELS		NIOSH	OTHER
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	
Due to potential for decomposition to methanol, the following exposure limits for methanol are given.									
Methanol	67-56-1	262 (skin)	328 (skin)	260	325 (Vacated 1989 PEL)	260 (skin)	325 (skin)	6000	DFG MAKs: TWA = 270 (skin) PEAK = 4•MAK 15 min average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: C

NE = Not Established.

See Section 16 for Definitions of Terms Used.

INTERNATIONAL EXPOSURE LIMITS: Currently, the following international exposure limits are in force the components of this product and the decomposition product, methanol. Exposure limits change and should be checked.

ACRYLIC ACID:

Australia: TWA = 2 ppm (5.9 mg/m³), JUL 2008
 Belgium: TWA = 2 ppm (6 mg/m³), Skin, MAR 2002
 Denmark: TWA = 2 ppm (5.9 mg/m³), OCT 2002
 Finland: TWA = 2 ppm (6 mg/m³), STEL = 15 ppm (45 mg/m³), SEP 2009
 France: VME = 2 ppm (6 mg/m³), VLE = 10 ppm (30 mg/m³), FEB 2006
 Germany: MAK = 30 mg/m³ (10 mL/m³), 2005
 Korea: TWA = 10 ppm (30 mg/m³), 2006
 The Netherlands: MAC-TGG = 5.9 mg/m³, 2003
 New Zealand: TWA = 2 ppm (5.9 mg/m³), skin, JAN 2002
 Norway: TWA = 10 ppm (30 mg/m³), JAN 1999
 Russia: TWA = 5 mg/m³, STEL = 15 mg/m³, JUN 2003
 Sweden: TWA = 10 ppm (30 mg/m³); STEL = 15 ppm (45 mg/m³), JUN 2005
 Switzerland: MAK-W = 10 ppm (30 mg/m³); KZG-W = 10 ppm (30 mg/m³), DEC 2006
 In Argentina, Bulgaria, Colombia, Jordan, New Zealand, Singapore, Vietnam check ACGIH TLV

2-HYDROXYETHYL METHACRYLATE:

The Netherlands: MAC-TGG = 0.24 mg/m³, 2003

METHANOL:

ARAB Republic of Egypt: TWA = 200 ppm (260 mg/m³), Skin, JAN 1993
 Australia: TWA = 200 ppm (262 mg/m³), STEL = 250 ppm (328 mg/m³), JUL 2008
 Belgium: TWA = 200 ppm (266 mg/m³), MAR 2002
 Belgium: STEL = 250 ppm (333 mg/m³), Skin, MAR 2002

METHANOL (continued):

Denmark: TWA = 200 ppm (260 mg/m³), OCT 2002
 EC: TWA = 260 mg/m³ (200 mL/m³), FEB 2006
 Finland: TWA = 200 ppm (270 mg/m³), STEL = 250 ppm (330 mg/m³), Skin, SEP 2009
 France: VME = 200 ppm (260 mg/m³), VLE = 1000 ppm (1300 mg/m³), FEB 2006
 Germany: MAK = 270 mg/m³ (200 mL/m³), 2005
 Hungary: TWA = 260 mg/m³, STEL = 1040 mg/m³, Skin, SEP 2000
 Japan: OEL = 200 ppm (260 mg/m³), skin, APR 2007
 Korea: TWA = 200 ppm (260 mg/m³), STEL = 250 ppm (310 mg/m³), skin, 2006
 Mexico: TWA = 200 ppm (260 mg/m³); STEL = 310 mg/m³ (250 ppm), 2004
 The Netherlands: MAC-TGG = 260 mg/m³, Skin, 2003
 New Zealand: TWA = 200 ppm (262 mg/m³); STEL = 250 ppm (328 mg/m³), skin, JAN 2002
 Norway: TWA = 100 ppm (130 mg/m³), JAN 1999
 The Philippines: TWA = 200 ppm (260 mg/m³), JAN 1993
 Poland: MAC(TWA) = 100 mg/m³, MAC(STEL) = 300 mg/m³, JAN 1999
 Russia: TWA = 5 mg/m³, STEL = 15 mg/m³, Skin, JUN 2003
 Sweden: TWA = 200 ppm (250 mg/m³); STEL = 250 ppm (350 mg/m³), Skin, JUN 2005
 Switzerland: MAK-W = 200 ppm (260 mg/m³), KZG-W = 800 ppm (1040 mg/m³), Skin, DEC 2006
 Thailand: TWA = 200 ppm (260 mg/m³), JAN 1993
 Turkey: TWA = 200 ppm (260 mg/m³), JAN 1993
 United Kingdom: TWA = 200 ppm (266 mg/m³); STEL = 250 ppm (skin), 2005
 In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam, check ACGIH TLV

ENVIRONMENTAL EXPOSURE CONTROLS: Refer to Sections 6, 7 and 13 for information on controlling exposure to this product to the environment.

PROTECTIVE EQUIPMENT: 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 U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR 1910.132), equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02, Z94.3-M1982, Industrial Eye and Face Protectors and CSA Standard Z195-02, Protective Footwear), or standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand protection, and CR 13464:1999 for face/eye protection). Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain the Oxygen level above 19.5% in the workplace. 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. If necessary, use only respiratory protection authorized in appropriate regulations to assist in equipment selection. The following are NIOSH respiratory protection guidelines for the potential methanol decomposition product; these guidelines are given to assist in selection of respiratory protective equipment.

METHANOL

CONCENTRATION RESPIRATORY PROTECTION

Up to 2000 ppm: Any Supplied-Air Respirator (SAR).
 Up to 5000 ppm: Any SAR operated in a continuous-flow mode.
 Up to 6000 ppm: Any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any Self-Contained Breathing Apparatus SCBA with a full facepiece, or any SAR 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 appropriate escape-type, SCBA.

EYE PROTECTION: Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations to assist in equipment selection.

HAND PROTECTION: Wear butyl rubber, Teflon™, Barricade™, Chemrel™, nitrile or similar gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. If necessary, refer to applicable regulations and standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

PROTECTIVE EQUIPMENT (continued):

BODY PROTECTION: Use body protection appropriate for task. Safety shoes are recommended when handling cylinders. 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. If necessary, refer to appropriate regulations to assist in equipment selection.

9. PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.

COLOR: Clear, colorless.

MOLECULAR FORMULA: Mixture.

MOLECULAR WEIGHT: Mixture.

ODOR: Acrylic.

ODOR THRESHOLD: Not established.

RELATIVE VAPOR DENSITY (air = 1): > 1.0

EVAPORATION RATE (nBuAc = 1): < 1.0

SPECIFIC GRAVITY (water = 1): 1.08

MELTING/FREEZING POINT: Not established.

SOLUBILITY IN WATER: Insoluble.

BOILING POINT: Not established.

VAPOR PRESSURE, mm Hg: 6

pH: 7.0

% VOLATILE: < 1

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

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

10. STABILITY and REACTIVITY

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

DECOMPOSITION PRODUCTS: *Combustion:* Nitrogen and carbon oxides. *Hydrolysis:* Methanol.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, strong acids, strong bases, water, moist air.

POSSIBILITY OF HAZARDOUS REACTIONS: 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.

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: Inhalation of mists or vapors of this product can irritate the nose and other tissues of the upper respiratory system. Due to the potential generation of methanol as a decomposition product, inhalation of high vapor concentrations (as may occur if this material is used in a poorly ventilated area) can result in symptoms of central nervous system depression (e.g., headaches, dizziness, nausea). Refer to "Other Potential Health Effects" for additional information.

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 a potential route of exposure for this product. Symptoms of such exposure would include those listed under "Other Potential Health Effects".



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.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	2*
FLAMMABILITY HAZARD	(RED)	1
PHYSICAL HAZARD	(YELLOW)	1

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

11. TOXICOLOGICAL INFORMATION (Continued)

OTHER POTENTIAL HEALTH EFFECTS: This product can generate methanol if in contact with water. Inhalation of high concentrations of methanol vapors can cause systemic effects including central nervous system depression, visual disturbances, changes in circulation, cough, dyspnea, headache, lacrymation, nausea or vomiting. Symptoms may be delayed. It is important to note that if this product is swallowed, potentially significant quantities of methanol can be generated in the stomach. Ingestion of methanol has the potential to cause permanent blindness and death. A fatal dose is between 60-200 mL for most adults. Ingestion of methanol may cause heart, liver kidney or central nervous system effects, severe gastrointestinal distress and acidosis of the organs, leading to damage. Onset of symptoms of methanol Poisoning may be delayed up to 48 hours. Repeated inhalation or skin absorption exposures may also to methanol cause blindness.

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. Due to the potential generation of methanol from water or moisture, inhalation of high concentrations of this product's vapors can cause dizziness, headaches, and nausea. Ingestion of this product may cause blindness and death as a result of methanol generation.

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). Repeated inhalation or skin absorption exposures to methanol, which can be generated from a component of this product, may cause blindness.

TARGET ORGANS: **Acute:** Skin, eyes, respiratory system. **Chronic:** Skin, 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
LD₅₀ (Oral-Rat) 33,500 µg/kg
LD₅₀ (Oral-Mouse) 2400 mg/kg: Tumorigenic: active as anti-cancer agent
LD₅₀ (Intraperitoneal-Rat) 22 mg/kg
LD₅₀ (Intraperitoneal-Mouse) 144 mg/kg
LD₅₀ (Skin-Rabbit) 280 µL/kg
LD₅₀ (Subcutaneous-Mouse) 1590 mg/kg
LD₅₀ (Unreported-Rat) 1250 mg/kg
LD₅₀ (Unreported-Mouse) 830 mg/kg
LD₅₀ (Unreported-Rabbit) 250 mg/kg
LCLo (Inhalation-Rat) 4000 ppm/4 hours
LC₅₀ (Inhalation-Mouse) 5300 mg/m³/2 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
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

ACRYLIC ACID (continued):

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: Multi-Generation: Reproductive: Maternal Effects: other effects; 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
Cytogenetic Analysis (Hamster-Ovary) 116 mg/L
Mutation in Mammalian Somatic Cells (Mouse-Lymphocyte) 500 mg/L
ALIPHATIC METHACRYLATE OLIGOMER:
Currently, there are no toxicological data for this compound.

2-HYDROXYETHYL METHACRYLATE:

LD₅₀ (Oral-Rat) 5050 mg/kg: Behavioral: coma
LD₅₀ (Oral-Mouse) 3275 mg/kg: Behavioral: coma
LD₅₀ (Oral-Guinea Pig) 4680 mg/kg: Behavioral: coma
LD₅₀ (Intraperitoneal-Rat) 1250 mg/kg
LD₅₀ (Intraperitoneal-Mouse) 497 mg/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
LDLo (Intravenous-Dog) 99,200 nL/kg
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
LD₅₀ (Oral-Rat) 4890 mg/kg: Behavioral: tremor; Lungs, Thorax, or Respiration: dyspnea; Skin and Appendages: hair
LD₅₀ (Skin-Rabbit) > 5 gm/kg
METHACRYLOXYPROPYL TRIMETHOXSILANE:
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Mild
Standard Draize Test (Eye-Rabbit) 500 mg/24 hours: Mild
LD₅₀ (Oral-Rat) 22,600 µL/kg
LDLo (Intravenous-Rat) 226 mg/kg
LD (Skin-Rabbit) > 20 mL/kg
TCLo (Inhalation-Rat) 143 mg/m³/6 hours/4 weeks-intermittent: Lungs, Thorax, or Respiration: other changes

CARCINOGENIC POTENTIAL OF COMPONENTS: Components of this product 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 Human Carcinogenicity)

The remaining components of this product listed in Section 3 (Composition and Information on Ingredients) are **not** found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, IARC, GERMAN MAK, and ACGIH, and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

11. TOXICOLOGICAL INFORMATION (Continued)

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: Currently, there is no information on the potential human mutagenic, embryotoxic, teratogenic or reproductive effects from this product or its components.

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

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
METHANOL • Methanol in urine	• End of shift	• 15 mg/L

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. The following information is available for some components and the possible decomposition product, methanol.

ACRYLIC ACID:

The Koc of this compound is 43. According to a classification scheme, this Koc value suggests that this material is expected to have very high mobility in soil. A pKa of 4.25 indicates that this compound should exist predominantly in the anionic form under environmental conditions of pH 5-9, suggesting even higher mobility of acrylic acid in soil.

2-HYDROXYETHYL METHACRYLATE:

The Koc of this compound is estimated as approximately 43, using a log Kow of 0.47 and a regression-derived equation. According to a classification scheme, this estimated Koc value suggests that this material is expected to have very high mobility in soil.

METHANOL:

Using a structure estimation method based on molecular connectivity indices, the Koc for this compound can be estimated to be 1. According to a classification scheme, this estimated Koc value suggests that this material is expected to have very high mobility in soil.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. Acrylate compounds will decompose over time in the environment. The following information is available for some components.

ACRYLIC ACID:

If released to air, a vapor pressure of 3.97 mm Hg at 25°C indicates this compound will exist solely as a vapor in the ambient atmosphere. Vapor-phase material will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 2 days. Because the structurally similar compound ethyl acrylate does not absorb light in the environmental UV spectrum (> 290 nm), this compound is not expected to directly photolyze. If released to soil, acrylic acid is expected to have very high mobility based upon a Koc of 43. A pKa of 4.25 indicates this material will exist almost entirely in the anionic form at pH values of 5 to 9; the anionic form is not expected to volatilize. Volatilization from moist soil surfaces is expected to be slow based upon a Henry's Law constant of 3.2×10^{-7} atm-cu m/mole. This compound may potentially volatilize from dry soil surfaces based upon its vapor pressure. This material, formed from hydrolysis of acrylamide added to soil, was totally degraded within 15 days of its formation. If released into water, this compound is not expected to adsorb to suspended solids and sediment in the water column based upon the estimated Koc. Biodegradation under both aerobic and anaerobic conditions is expected to occur; it reached 68% of its theoretical BOD in 2 weeks using an activated sludge inoculum and 71% was mineralized in a 42-day anaerobic screening study using a sewage seed inoculum. Volatilization from water surfaces is expected to occur slowly based upon this compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 96 days and 700 days, respectively. The pKa of this compound indicates that it will exist almost entirely in the anionic form at environmental pHs and therefore volatilization from water surfaces is not expected to be an important fate process.

2-HYDROXYETHYL METHACRYLATE:

If released to air, a vapor pressure of 0.126 mm Hg at 25°C indicates this compound will exist solely as a vapor in the ambient atmosphere. Vapor-phase material will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 16 hours. Because the structurally similar ethyl methacrylate does not absorb light in the environmental UV spectrum (> 290 nm), this compound is not expected to directly photolyze. If released to soil, this compound is expected to have very high mobility based upon an estimated Koc of 43. Volatilization from moist soil surfaces is not expected to be an important fate process based upon an estimated Henry's Law constant of 4.6×10^{-9} atm-cu m/mole. This material is not expected to volatilize from dry soil surfaces based upon its vapor pressure. If released into water, this compound is not expected to adsorb to suspended solids and sediment in the water column based upon the estimated Koc. This material reached 92-100% of its theoretical BOD in 2 weeks using an activated sludge inoculum. Volatilization from water surfaces is not expected to be an important fate process based upon this compound's estimated Henry's Law constant. An estimated BCF of 1.3 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis of this material 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.

METHANOL:

If released to the atmosphere, a vapor pressure of 127 mm Hg at 25°C indicates that this compound will exist solely in the vapor phase. Vapor phase material is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days. If released to soil, this compound is expected to have very high mobility based upon an estimated Koc of 1. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 4.55×10^{-6} atm-cu m/mole. This compound may also volatilize from dry soils based upon its vapor pressure. Biodegradation in soils is expected to occur rapidly based on half-lives in a sandy silt loam from Texas and a sandy loam from Mississippi of 1 and 3.2 days, respectively. If released into water, methanol is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 3 and 35 days, respectively. Biodegradation is expected to occur in natural waters since this material is degraded quickly in soils and was biodegraded rapidly in various aqueous screening tests using sewage seed or activated sludge. BCF values of less than 10, measured in fish suggests bioconcentration in aquatic organisms is low. Hydrolysis of this material and photolysis in sunlit surface waters are not expected since methanol lacks functional groups that are susceptible to hydrolysis or photolysis under environmental conditions.

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

ACRYLIC ACID:

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:

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

METHANOL:

Fish (golden ide) exposed to 0.05 mg/L of Methanol for three days in an aquatic tank had measured BCF values of less than 10. Based on a classification scheme, this BCF value suggests that bioconcentration in aquatic organisms is low.

12. ECOLOGICAL INFORMATION (Continued)

ECOTOXICITY: 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 and the possible decomposition product, methanol.

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
Toxicity threshold (cell multiplication inhibition test):
(*Uronema parduzzi* Chatton-Lwoff protozoa) 11 mg/L
EC₀ (*Daphnia magna*) [neutralized] 24 hours = 175 mg/L
EC₅₀ (*Daphnia magna*) [neutralized] 24 hours = 765 mg/L
EC₁₀₀ (*Daphnia magna*) [neutralized] 24 hours = 5,000 mg/L
EC₀ (*Daphnia magna*) 24 hours = 51 mg/L
EC₅₀ (*Daphnia magna*) 24 hours = 54 mg/L
EC₁₀₀ (*Daphnia magna*) 24 hours = 91 mg/L
LC₀ (*Leuciscus idus*) 48 hours = 210 mg/L

ACRYLIC ACID (continued):

LC₅₀ (*Leuciscus idus*) 48 hours = 315 mg/L
LC₀ (*Leuciscus idus*) 48 hours = 420 mg/L
2-HYDROXYETHYL METHACRYLATE:
LC₅₀ (*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 (CaCO₃), Tank vol: 2.0 l, additions: 18 vol/day (flow-through bioassay)
METHACRYLOXYPROPYL TRIMETHOXSILANE:
LC₅₀ (*Leuciscus idus*) 48 hours = 493 mg/L
METHANOL:
toxic (*Chlorella pyrenoidosa*) = 31,100 mg/L
BCF (*Chlorella fusca*) [wet wt] = 28,400
NOEC (*Daphnia*) 48 hours = 10,000 mg/L
EC₀ (*Pseudomonas putida*) 16 hours = 6,600 mg/L
EC₀ (*Microcystis aeruginosa*) 8 days = 530 mg/L
EC₀ (*Scenedesmus quadricauda*) 7 days = 8,000 mg/L
EC₀ (*Entosiphon sulcatum*) 72 hours = >10,000 mg/L
EC₀ (*Uronema parduzzi* Chatton-Lwoff) = >10,000 mg/L

METHANOL (continued):

EC₅₀ (*Daphnia magna* Straus) 24 hours = > 10,000 mg/L
EC_{50,F} (*Salmo gairdneri*) 96 hours = 13,000 mg/kg
EC_{50,F} (*Pimephales promelas*) 96 hours = 28,900 mg/L
EC_{50,F} (*Lepomis macrochirus*) 96 hours = 12,700 mg/L
EC₁₀₀ (*Daphnia magna* Straus) 24 hours = >10,000 mg/L
METHANOL (continued):
IC₅₀ (*Nitocra spinipes*) 96 hours = 12,000 mg/L
LD₀ (*Pseudomonas putida*) = 600 mg/L
LD₀ (*Scenedesmus*) = 10,000 mg/L
LD₀ (*Colpoda*) = 1,250 mg/L
LC₀ (creek chub) 24 hours = 8,000 mg/L
LC₅₀ (trout) 48 hours = 8,000 mg/L
LC₅₀ (*Artemia salina*) 24 hours = >10,000 mg/L
LC₅₀ (*Alburnus alburnus*) 96 hours = 28,000 mg/L
LC₅₀ (*Nitocra spinipes*) 96 hours = 12,000 mg/L
LC_{50,F} (*Salmo gairdneri*) 96 hours = 20,100 mg/L
LC_{50,F} (*Pimephales promelas*) 96 hours = 29,400 mg/L
LC_{50,F} (*Lepomis macrochirus*) 96 hours = 15,400 mg/L
LC₁₀₀ (creek chub) 24 hours = 17,000 mg/L

OTHER ADVERSE EFFECTS: Components of this product are not listed as having 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.

RESULTS OF PBT and vPvB ASSESSMENT: No data available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

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 impermeable containers (such as 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.

EWC WASTE CODE: 08 04 99 wastes from MFSU of adhesives and sealants, not otherwise specified

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:

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This material is NOT considered by the United Nations Economic Commission for Europe to be dangerous goods.

TRANSPORT IN BULK ACCORDING TO THE IBC CODE: Not applicable.

15. REGULATORY INFORMATION

ENVIRONMENTAL HAZARDS: This product does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN); components are not specifically listed in Annex III under MARPOL 73/78.

15. REGULATORY INFORMATION, continued

ADDITIONAL 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, 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 SDS 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): Not applicable.

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.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL 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.

ADDITIONAL EU REGULATIONS:

SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE PRODUCT: This product may have other requirements under country specific regulations.

- Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

CHEMICAL SAFETY ASSESSMENT: No data available. The chemical safety assessment is required for some substances according to European Union Regulation (EC) 1907/2006, Article 14.

REACH (Registration, Evaluation, and Authorization of Chemicals) DIRECTIVE:

Ingredients: Ingredients have been pre-registered, are of proprietary identity, or are exempt from registration (e.g. polymers). This product does not contain any ingredients which are classified as SVHC (Substances of Very High Concern) under current REACH legislation.

Product: Export volumes of product (and thus each of its ingredients) fall under per annum limit for regulation under REACH.

16. OTHER INFORMATION

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 REACTION. WHEN HEATED, POLYMERIZATION MAY OCCUR AND RUPTURE CONTAINERS. CONTACT WITH WATER CAN CAUSE A REACTION AND GENERATE METHANOL. COMBUSTIBLE-CAN IGNITE IF EXPOSED TO HIGH TEMPERATURE OR DIRECT FLAME. CONTAINS COMPOUND TOXIC TO AQUATIC ORGANISMS. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing vapor or mists. Avoid prolonged skin contact. Avoid contact with water or moisture. 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, CO₂, 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.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961 • Hilo, HI 96721 (800) 969-4846
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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: March 2012: Review and up-date entire SDS to comply with EU CLP 1272: 2008 and GHS.

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. NOVUS assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, NOVUS assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a SDS. 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.

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

DFG MAK Germ Cell Mutagen Categories: **1:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances which 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 which 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.

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 LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ 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 LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat 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. *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 LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat 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 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 LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat 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. *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 LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued): 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 III B, 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 coarse dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; 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. *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, in either 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. *Unstable 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.)

DEFINITION OF TERMS (Continued)

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 whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. 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. 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. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. 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 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity 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. 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 1000 ppm.

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 accordance with Annex D. **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 accordance with Annex D. 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 Recommendation 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 percent 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 a 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). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. Most ordinary combustible materials. **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 in 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 percent 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 (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 a 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 percent 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 percent 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 estimated 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 estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that 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. Materials that are sensitive to localized thermal or mechanical shock 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: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - 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/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. Other measures of toxicity include **TDL₀**, the lowest dose to cause a symptom and **TCL₀** 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.

REPRODUCTIVE TOXICITY INFORMATION:

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.

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_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** 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 Substances 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 and INTERNATIONAL:

The **DFG**: This is the Federal Republic of Germany's Occupation Health Agency, similar to the U.S. OSHA. **EU** is the European Community (formerly known as the **EEC**, European Economic Community). **EINECS**: This is the European Inventory of Now-Existing Chemical Substances. The **ARD** 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.