

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards and European EC Directives. This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to this product.

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):
 CHEMICAL NAME/CLASS:
 SYNONYMS:
 PRODUCT USE:
 SUPPLIER/MANUFACTURER'S NAME:
 ADDRESS:

VICTOR LOCK DE-ICER
 Flammable Aerosol Mixture
 Not Applicable
 De-icing of Locks
Ultramotive Corporation
 PO Box 58, Cushing Blvd
 Bethel, VT 05032
 North America: 1-800-424-9300 (Chemtrec)
 International: 1-703-527-3887 (Chemtrec)
 1-802-234-9901
 August 20, 2004

EMERGENCY PHONE:

BUSINESS PHONE:

DATE OF PREPARATION:

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless, flammable liquid in a pressurized can, with carbon dioxide as a propellant. **Health Hazards:** The health hazards associated with overexposure are minimal, due to the small size of the container and small volume of the contents. The liquid is in such small quantity that it does not normally present a health hazard. If a release of many containers of this product occurs at the same time, inhalation may cause central nervous system depression. In addition, under these circumstances an oxygen-deficient environment can occur, resulting in a hazard of asphyxiation. If the container is heated or punctured, rupture of the container may occur, and may cause injury. Frostbite can be caused by contact with rapidly expanding gases. **Flammability Hazards:** Due to the high level of Isopropanol in this product, it must be considered as flammable. Vapors of this product are heavier than air and may spread long distances; distant ignition and flash-back are possible. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** Release of this product to the environment is not expected to cause harm unless a large quantity of containers is released. **Emergency Recommendations:** Persons responding to an emergency such as a fire that involves this product must take precautions to avoid potential injury from containers that rupture and for the flammability of the product.

EC CLASSIFICATION: Due to the overall small amount of product contained in each can (less than 10 mL), no classification of this product is required, per Council Directive 83/265/EEC, 16 May, 1983, Article 6, 6

RISK PHRASES: Not applicable.

SAFETY PHRASES: Not applicable.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: Contact with this product is not expected to cause significant adverse health effects, due to the small size of container and limited amount of gas within the container.

INHALATION: Inhalation of vapors can irritate the mucous membranes, the nose, throat and respiratory tract. Human systemic effects following exposure via inhalation (and ingestion) include flushing, pulse rate decrease, lowering of blood pressure, headache, anesthesia, narcosis, dizziness, mental depression, hallucinations, distorted perceptions, dyspnea, respiratory depression, nausea or vomiting and in extreme cases, coma have been reported for the main component, Isopropanol. High concentrations of vapors, as may occur if the product is used or released in a poorly-ventilated area or confined space (or during a release of large volumes of this product), can cause unconsciousness. In addition, such conditions may produce an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of overexposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN OBSERVED EFFECT

12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

3. HAZARD IDENTIFICATION (Continued)

INHALATION (continued): Vapors of this product are heavier than air. High concentrations can accumulate in low-lying areas, resulting in a hazard of inhalation of an oxygen-deficient atmosphere, which may be fatal.

CONTACT WITH SKIN OR EYES: Contact of this product with the skin is not expected to cause adverse effect. If this product is sprayed or released directly into the eyes or to the skin, frostbite may occur, with damage to tissue. Repeated skin contact may cause defatting of the skin, resulting in dermatitis, with dry, red, itchy skin.



INGESTION: Not a likely route of exposure.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation In Lay Terms. Over-exposure to this gas mixture may cause the following health effects.

ACUTE: There are no anticipated acute effects after exposure to this product. In the event that a very large number of containers are released simultaneously, adverse effects on the central nervous system and irritation may occur and an oxygen-deficient environment may be produced.

CHRONIC: Chronic exposure to this product may cause dermatitis to the skin.

TARGET ORGANS: ACUTE: Eyes, respiratory system, cardiovascular and central nervous systems. CHRONIC: Skin.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD		(BLUE)	1
FLAMMABILITY HAZARD		(RED)	3
PHYSICAL HAZARD		(YELLOW)	0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For Routine Industrial Use and Handling Applications			

See Section 16 for Definition of Ratings

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS #	% w/w
Carbon Dioxide (propellant gas)	124-38-9	204-696-6	Trace
White Mineral Oil	8042-47-5	232-455-8	3.9%
Isopropanol	67-63-0	200-661-7	96.1%

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. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

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

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention, if adverse health effects occur. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with victim.

SKIN EXPOSURE: If skin contact results in irritation or other adverse effect, seek the advice of a doctor.

EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek medical attention if adverse health effects occur.

INHALATION: If this gas inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect occurs.

INGESTION: Not a likely route of exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing central nervous system or skin disorders may be aggravated by this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not determined for product. For Isopropanol: 11.7°C (53°F)

AUTOIGNITION TEMPERATURE: Not determined for product. For Isopropanol: 399°C (750°F)

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not determined for product. For Isopropanol: 2.0%

Upper (UEL): Not determined for product. For Isopropanol: 12.0%

FIRE EXTINGUISHING MATERIALS: If this product is involved in a fire, use extinguishing materials appropriate for surrounding materials.

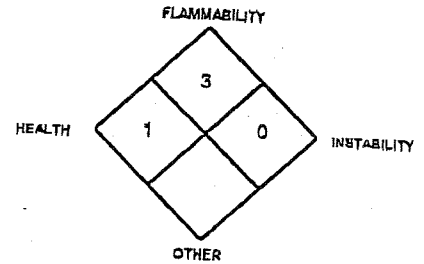
UNUSUAL FIRE AND EXPLOSION HAZARDS: The main component of this product, Isopropanol, is a Class IC flammable liquid. When involved in a fire, this product may decompose and produce toxic gases (including carbon monoxide and carbon dioxide). Vapors of this product may form explosive mixtures with air, at or above 11.7°C (53°F). The vapors of this product are heavier than air and may spread long distances; distant ignition and flash-back are possible. Vapors can accumulate in confined spaces, creating an oxygen-deficient atmosphere and flammability hazard.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. Use water spray to keep fire-exposed containers cool. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: A release of a single container or several containers presents a minimal hazard. Allow containers to vent and remove container for appropriate disposal. If a large quantity of cans of this product is involved, evacuate immediate area. Vapors of this product than air; releases will concentrate in low-lying areas, creating pockets of an oxygen-deficient atmosphere and may create a flammability hazard. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Eliminate all sources of ignition before cleanup operations begin. Use non-sparking tools. If a large quantity of product is involved, the minimum Personal Protective Equipment should be **Level B: Self-Contained Breathing Apparatus**. Allow the product to dissipate. Monitor the surrounding area for the level of Oxygen. Monitor the surrounding area for combustible vapor levels. The level of combustible vapors must be below 10% of the LEL of components (see Section 5, Fire-Fighting Measures) and the atmosphere must have at least 19.5 percent Oxygen before personnel are allowed into the spill area. Dispose of involved cans in accordance with applicable U.S. Federal, State, or local procedures, or appropriate Canadian Standards and those of EC Member States (see Section 13, Disposal Considerations).

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

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Do not eat or drink while handling this material. Use ventilation and other engineering controls to minimize potential exposure to the aerosol of this product.

STORAGE AND HANDLING PRACTICES: 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). Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours. Storage areas should be made of fire resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Refer to NFPA 30, *Flammable and Combustible Liquids Code*, for additional information on storage. Empty containers may contain residual liquid or vapors which are flammable; therefore, empty containers should be handled with care. Do not incinerate empty or partially filled containers.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Not applicable.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLV		OSHA-PEL		TWA ppm	NIOSH STEL ppm	IDLH ppm	OTHER ppm
		TWA ppm	STEL ppm	TWA ppm	STEL ppm				
Carbon Dioxide	124-38-9	5000	30,000	5000 10,000 (Vacated 1989 PEL)	30,000 (Vacated 1989 PEL)	5000	30,000	40,000	DFG MAKs: TWA = 5000 PEAK = 2•MAK 15min., average value, 1-hr Interval
Mineral Oil	8042-47-5	NIC = 0.2 (inhalable fraction)	NE	NE	NE	NE	NE	NE	CARCINOGEN: IARC-3,
Isopropanol	67-63-0	200	400	400	500 (Vacated 1989 PEL)	400	500	2000 (based on 10% of LEL)	DFG MAKs: TWA = 200 PEAK = 2•MAK 15 min., average value, 1-hr Interval MAK Pregnancy Risk Group Classification: C CARCINOGEN: IARC-3, TLV-A4

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

VENTILATION AND ENGINEERING CONTROLS: Not necessary under normal conditions of use.

RESPIRATORY PROTECTION: No respiratory protection is normally required when using this product. Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients), if applicable. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces, and, the European Standard EN149, and EC member states. 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). The following are NIOSH respiratory personal protective equipment guidelines for the main component, Isopropanol.

ISOPROPANOL

CONCENTRATION

Up to 2000 ppm:

RESPIRATORY PROTECTION

Any Supplied-Air Respirator (SAR) operated in a continuous-flow mode, or any Chemical Cartridge Respirator with a full facepiece and organic vapor cartridge(s), or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s), 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 Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

EYE PROTECTION: None needed under normal use. If a hazard of flying debris may occur, wear safety glasses or goggles. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or appropriate Canadian Standards. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, or the European Standard EN166.

HAND PROTECTION: None needed under normal conditions of use. If necessary, refer to U.S. OSHA 29 CFR 1910.138 appropriate Standards of Canada, or the European Economic Community.

BODY PROTECTION: None needed for normal circumstances of use. If necessary, refer to appropriate Standards of Canada and the European Economic Community. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

9. PHYSICAL and CHEMICAL PROPERTIES

The following values are for the main component, Isopropanol.

- VAPOR DENSITY (air = 1): 2.07
- FREEZING/MELTING POINT: -88.5°C (-127°F)
- SPECIFIC GRAVITY @ 20°C (68°F) water = 1: 0.785
- SOLUBILITY IN WATER @ 25°C (77°F): Miscible
- EVAPORATION RATE (nBuAc = 1): 1.5
- VAPOR PRESSURE 20°C (68°F): 33 mm Hg; 4.4 kPa
- LOG COEFFICIENT WATER/OIL DISTRIBUTION: Log P (oct) = 0.05
- ODOR THRESHOLD: 3.3-610 ppm [geometric mean 43 ppm](detection)
7.6-49 ppm [geometric mean 19 ppm] (recognition)
- BOILING POINT: 82.3°C (180°F)
- pH: Not established.
- MOLECULAR WEIGHT: 60.09
- EXPANSION RATIO: Not applicable.
- SPECIFIC VOLUME: Not applicable.

The following information is for the product:

- APPEARANCE, ODOR and COLOR:** This product is a colorless, odorless liquid in a pressurized can, with carbon dioxide as a propellant.
- HOW TO DETECT THIS SUBSTANCE (warning properties):** There are no distinct warning properties in event of a release of this product.

10. STABILITY and REACTIVITY

- STABILITY:** Stable under conditions of normal temperature and pressure.
- DECOMPOSITION PRODUCTS:** If exposed to fire, this product may decompose, yielding toxic products (e.g., carbon oxides).
- MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Due to the high level of Isopropanol, this product will be incompatible with strong oxidizing agents (i.e. peroxides, perchlorates, chromium trioxide), which will increase the risk of fire and explosion. The product may react violently or vigorously with strong acids, such as nitric acid, sulfuric acid and oleum, acid anhydrides. Due to the presence of Isopropanol, this product may give off flammable hydrogen gas in the presence of alkali or alkaline earth metals. The Isopropanol component reacts vigorously and gives off heat with aluminum. Isopropanol will react violently with crotonaldehyde or phosgene. Isopropanol, in contact with potassium tert-butoxide, may cause ignition. Mixtures or reactions of Isopropanol with the following materials may cause explosions: barium perchlorate, chlorine, dioxygenyl tetrafluoroborate, hypochlorous acid, ethylene oxide, hexamethylene diisocyanate and other isocyanates, nitrogen peroxide, permonosulfuric acid and tri-isobutyl aluminum. This product may attack some forms of rubber, plastics and coatings.
- HAZARDOUS POLYMERIZATION:** Will not occur.
- CONDITIONS TO AVOID:** Extreme temperatures, incompatible materials.

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following are toxicological data for components of greater than 1%:

ISOPROPANOL:

- Standard Draize Test (Skin-Rabbit) 500 mg: Mild
- Standard Draize Test (Eye-Rabbit) 100 mg: Severe
- Standard Draize Test (Eye-Rabbit) 10 mg: Moderate
- Standard Draize Test (Eye-Rabbit) 100 mg/24 hours: Moderate
- TDLo (Oral-Human) 286 mg/kg: Cardiac; arrhythmias (including changes in conduction); Behavioral: coma; Kidney, Ureter, Bladder; other changes
- TDLo (Oral-Human) 223 mg/kg: Behavioral: hallucinations, distorted perceptions; Cardiac: pulse rate; Vascular: BP lowering not characterized in autonomic section
- TDLo (Oral-Man) 14,432 mg/kg: Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: dyspnea
- TDLo (Oral-Infant) 13 gm/kg: Behavioral: somnolence (general depressed activity), Irritability; Gastrointestinal: nausea or vomiting

ISOPROPANOL (continued):

- TDLo (Unreported-Infant) 1375 mg/kg: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Behavioral: somnolence (general depressed activity), hallucinations, distorted perceptions
- LDLo (Oral-Human) 571 mL/kg
- LDLo (Oral-Man) 5272 mg/kg: Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: chronic pulmonary edema
- LDLo (Oral-Human) 3570 mg/kg: Behavioral: coma; Lungs, Thorax, or Respiration: respiratory depression; Gastrointestinal: nausea or vomiting
- LDLo (Unreported-Human) 2 mL/kg
- LDLo (Unreported-Human) 2770 mg/kg
- LC50 (Inhalation-Rat) 72,600 mg/m³: Behavioral: general anesthetic; Lungs, Thorax, or Respiration: other changes
- LC50 (Inhalation-Mouse) 53,000 mg/m³: Behavioral: general anesthetic; Lungs, Thorax, or Respiration: other changes

ISOPROPANOL (continued):

- LD50 (Oral-Rat) 5045 mg/kg: Behavioral: altered sleep time (including change in righting reflex), (general depressed activity)
- LD50 (Oral-Rat) 5000 mg/kg: Behavioral: general anesthetic
- LD50 (Oral-Mouse) 3600 mg/kg: Behavioral: general anesthetic
- LD50 (Oral-Rabbit) 6410 mg/kg
- LD50 (Intravenous-Mouse) 1509 mg/kg
- LD50 (Skin-Rabbit) 12,800 mg/kg
- LD50 (Intravenous-Rabbit) 1184 mg/kg
- LD50 (Intraperitoneal-Rabbit) 667 mg/kg
- LD50 (Intraperitoneal-Guinea Pig) 2560 mg/kg
- LD50 (Intraperitoneal-Hamster) 3444 mg/kg
- LDLo (Oral-Dog) 1537 mg/kg: Gastrointestinal: nausea or vomiting
- LDLo (Oral-Cat) 6 mL/kg
- LDLo (Intravenous-Dog) 1024 mg/kg
- LDLo (Intravenous-Cat) 1963 mg/kg

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

ISOPROPANOL (continued):

LDLo (Parenteral-Frog) 20 gm/kg: Peripheral Nerve and Sensation: spastic paralysis with or without sensory change; Behavioral: somnolence (general depressed activity)

LDLo (Subcutaneous-Mouse) 6 gm/kg

LDLo (Subcutaneous-Mammal-Species Unspecified) 6 gm/kg: Peripheral Nerve and Sensation: spastic paralysis with or without sensory change; Behavioral: general anesthetic; Lungs, Thorax, or Respiration: other changes

TDLo (Oral-Rat) 7 mL/kg/7 days-Intermittent; Liver: other changes; Biochemical: Effect on specific coenzyme: B vitamins including folate

TDLo (Oral-Rat) 11,340 mg/kg/45 days-Intermittent; Endocrine: effect on menstrual cycle

TDLo (Oral-Rat) 2196 mg/kg/122 days-Intermittent; Endocrine: effect on menstrual cycle

TDLo (Oral-Rat) 2196 mg/kg/122 days-Intermittent; Reproductive; Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count)

TDLo (Oral-Rat) 11,340 mg/kg female 45 day(s) pre-mating; Reproductive; Maternal Effects: menstrual cycle changes or disorders

TDLo (Oral-Rat) 5040 mg/kg: female 1-20 day(s) after conception; Reproductive; Fertility: litter size (e.g. # fetuses per litter; measured before birth)

TDLo (Oral-Rat) 8 gm/kg: female 6-15 day(s) after conception; Reproductive; Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (Oral-Rat) 32,400 µg/kg: female 26 week(s) pre-mating; Reproductive; Effects on Embryo or Fetus: fetal death

TDLo (Oral-Rat) 3500 gm/kg: multigeneration; Reproductive; Fertility: mating performance (e.g. # sperm positive females per # females mated; # copulations per # estrus cycles)

TDLo (Intraperitoneal-Rat) 800 mg/kg: Behavioral: ataxia

TCLo (Inhalation-Rat) 8000 ppm/8 hours/20 weeks-Intermittent; Peripheral Nerve and Sensation: sensory change involving peripheral nerve, recording from peripheral motor nerve

ISOPROPANOL (continued):

TCLo (Inhalation-Rat) 100 mg/m³/4 hours/17 weeks-Intermittent; Kidney, Ureter, Bladder: other changes in urine composition; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase

TCLo (Inhalation-Rat) 5000 ppm/6 hours/90 days-Intermittent; Behavioral: changes in motor activity (specific assay)

TCLo (Inhalation-Rat) 2500 ppm/6 hours/2 years-Intermittent; Liver: changes in liver weight; Kidney, Ureter, Bladder: other changes in urine composition, changes in bladder weight

TCLo (Inhalation-Rat) 500 mg/m³/4 hours/122 days-Intermittent; Liver: multiple effects; Kidney, Ureter, Bladder: other changes; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TCLo (Inhalation-Rat) 20 mg/m³/24 hours/90 days-continuous; Brain and Coverings: other degenerative changes; Lungs, Thorax, or Respiration: other changes; Liver: multiple effects

TCLo (Inhalation-Rat) 3500 ppm/7 hours: female 1-19 day(s) after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TCLo (Inhalation-Rat) 10000 ppm/7 hours: female 1-19 day(s) after conception; Reproductive; Fertility: pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea), post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Effects on Embryo or Fetus: fetal death

TCLo (Inhalation-Rat) 4900 mg/m³/6 hours/2 weeks-Intermittent; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: multiple enzyme effects

TCLo (Inhalation-Rat) 7000 ppm/7 hours: female 1-19 day(s) after conception; Reproductive; Specific Developmental: Abnormalities: musculoskeletal system

ISOPROPANOL (continued):

TCLo (Inhalation-Rat) 1000 mg/m³/6 hours/4 weeks-Intermittent; Sense Organs and Special Senses (Eye): optic nerve neuropathy

TCLo (Inhalation-Mouse) 10000 ppm/6 hours/11 days-Intermittent; Behavioral: general anesthetic, ataxia; Related to Chronic Data: death

TCLo (Inhalation-Mouse) 5000 ppm/6 hours/13 weeks-Intermittent; Behavioral: somnolence (general depressed activity); Liver: changes in liver weight; Blood: pigmented or nucleated red blood cells

TCLo (Inhalation-Mouse) 5000 ppm/6 hours/13 weeks-Intermittent; Behavioral: general anesthetic, ataxia; Liver: changes in liver weight

TCLo (Inhalation-Mouse) 5000 ppm/6 hours/78 weeks-Intermittent; Brain and Coverings: changes in brain weight; Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis)

TCLo (Inhalation-Mouse) 3000 ppm/6 minutes; Lungs, Thorax, or Respiration: respiratory depression

TCLo (Inhalation-Guinea Pig) 980 mg/m³/24 hours; Sense Organs and Special Senses (Ear): effect, not otherwise specified; Behavioral: general anesthetic; Lungs, Thorax, or Respiration: other changes

TDLo (Oral-Rabbit) 6240 mg/kg: female 6-18 day(s) after conception; Reproductive; Maternal Effects: other effects

TDLo (Oral-Rat) 3276 mg/kg: female 182 day(s) pre-mating; Reproductive; Specific Developmental Abnormalities: other developmental abnormalities; Effects on Newborn: viability index (e.g., # alive at day 4 per # born alive), growth statistics (e.g.%, reduced weight gain)

Cytogenetic Analysis (Inhalation-Rat) 1030 µg/m³/16 weeks-Intermittent

WHITE MINERAL OIL:

TDLo (Oral-Rat) 92 gm/kg/92 days-continuous; Liver: changes in liver weight; Blood: changes in leukocyte (WBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain

SUSPECTED CANCER AGENT: Components of this product are listed by agencies tracking carcinogenic potential of chemical compounds, as follows:

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

WHITE MINERAL OIL: IARC-3: (Unclassifiable as to Carcinogenicity in Humans)

The remaining components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA, and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product may be irritating if contact is prolonged.

SENSITIZATION TO THE PRODUCT: Components of this product are not known to be a human skin or respiratory sensitizer.

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

Mutagenicity: Components of this product are not reported to produce mutagenic effects in humans. Data are available for Isopropanol in microorganisms.

Embryotoxicity: Components of this product are not reported to produce embryotoxic effects in human.

Teratogenicity: Components of this product are not reported to cause teratogenic effects in humans.

Reproductive Toxicity: Components of this product are not reported to cause adverse reproductive effects in humans. Animal reproductive toxicity data are available for Isopropanol; these data were obtained during clinical studies on specific animal tissues exposed to of this compound.

11. TOXICOLOGICAL INFORMATION (Continued)

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 EXPOSURE INDICES: Currently, there are no following Biological Exposure Indices (BEIs) determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The following is environmental fate information for components of this product.

ISOPROPANOL:

Terrestrial Fate: Based on a classification scheme, an estimated Koc value of 25, determined from a log Kow of 0.05(2) and a regression-derived equation, indicates that isopropanol is expected to have very high mobility in soil. Volatilization of isopropanol from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 8.10×10^{-6} atm-cu m/mole. The potential for volatilization of isopropanol from dry soil surfaces may exist based upon a vapor pressure of 45.4 mm Hg. Isopropanol is readily degraded in aerobic systems; the range of half-lives for aerobic degradation using a sewage sludge inoculum are < 1 day to 48 days. Isopropanol has also been shown to be readily degraded under anaerobic conditions.

Aquatic Fate: Based on a classification scheme, an estimated Koc value of 25, determined from a log Kow of 0.05 and a regression-derived equation, indicates that isopropanol is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected based upon a Henry's Law constant of 8.10×10^{-6} atm-cu m/mole. Using this Henry's Law constant and an estimation method, volatilization half-lives for a model river and model lake are 57 hours and 29 days, respectively. According to a classification scheme, an estimated BCF of 3, from a log Kow and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is low. Isopropanol is readily degraded in aerobic systems; the range of half-lives for aerobic degradation using a sewage sludge inoculum are < 1 day to 48 days. Isopropanol has also been shown to be readily degraded under anaerobic conditions.

Atmospheric Fate: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, isopropanol, which has a vapor pressure of 45.4 mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase isopropanol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 3.2 days, calculated from its rate constant of 5.07×10^{-12} cu cm/molecule-sec at 25°C.

Bioconcentration: An estimated BCF of 3 was calculated for isopropanol, using a log Kow of 0.05 and a regression-derived equation. 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 is not expected to be harmful to plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product is not expected to cause adverse effects to an aquatic environment. The following are aquatic toxicity data for components of this product:

ISOPROPANOL:

- EC₀ (*Microcystis aeruginosa*) 8 days = 1,000 mg/L
- EC₀ (*Scolecodesmus quadricauda* green algae) 7 days = 1,800 mg/L
- EC₀ (*Entosiphon sulcatum* protozoa) 72 hours = 4,930 mg/L
- EC₀ (*Uronema parducl* Chatton-Lwoff) = 3,425 mg/L
- EC₅₀ (*Photobacterium*) 5 minutes = 22,800 mg/L
- EC₅₀ (*Daphnia magna*) 3,010 mg/L
- EC₅₀ (*Pseudomonas putida*) 16 hours = 1,050 mg/L

ISOPROPANOL (continued):

- Toxic (*Chlorella pyrenoidosa* algae) = 17,400 mg/L
- NOEC (*Daphnia magna*) 757-2,100 mg/L
- LC₀ (creek chub) 24 hours = 900 mg/L
- LC₅₀ (*Artemia salina*) 24 hours = 16,700 mg/L
- LC₅₀ (*Streptocephalus proboscideus*) 24 hours = 11,600 mg/L
- LC₅₀ (*Daphnia magna*) 24 hours = 9,500 mg/L
- LC₅₀ (*Brachionus calyciflorus*) 24 hours = 28,600 mg/L
- LC₅₀ (*Crangon crangon* brown shrimp) 48 hours = 1,400 mg/L

ISOPROPANOL (continued):

- LC₅₀ (*Crangon crangon* brown shrimp) 98 hours = 1,150 mg/L
- LC₅₀ (goldfish) 24 hours = > 500 mg/L
- LC₅₀ (fathead minnow) 1 hour = 11,830 mg/L
- LC₅₀ (fathead minnow) 24 hours = 11,160 mg/L
- LC₅₀ (fathead minnow) 48 hours = 11,130 mg/L
- LC₅₀ (fathead minnow) 72 hours = 11,130 mg/L
- LC₅₀ (fathead minnow) 96 hours = 11,130 mg/L
- LC₅₀ (*Poecilia reticulata* guppy) 7 days = 7,060 mg/L
- LC₅₀ (*Daphnia magna*) 4,600 mg/L
- LC₁₀₀ (creek chub) 24 hours = 1,100 mg/L

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from the cylinder must be disposed of in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada and its Provinces and the EC and EC Member States.

U.S. EPA WASTE NUMBER: Not applicable to wastes consisting only of this product.

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS: This product is classified (per 49 CFR 172.101) by the U.S. Department of Transportation, as follows.

- PROPER SHIPPING NAME:** Consumer commodity
- HAZARD CLASS NUMBER and DESCRIPTION:** ORM-D
- UN IDENTIFICATION NUMBER:** Not Applicable
- PACKING GROUP:** Not Applicable
- DOT LABEL(S) REQUIRED:** None

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 171

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

14. TRANSPORTATION INFORMATION (Continued)

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is classified, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

PROPER SHIPPING NAME: Consumer commodity (Isopropanol)
HAZARD CLASS NUMBER and DESCRIPTION: Class 2.1 (Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1950
PACKING GROUP: Not Applicable
HAZARD LABEL(S) REQUIRED: Class 2.1 (Flammable Gas)
MARINE POLLUTANT: Not Applicable
SPECIAL PROVISIONS: 80
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX: 1
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX: 75

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is considered as dangerous goods under the rules of IATA.

PROPER SHIPPING NAME: Consumer commodity
HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)
UN IDENTIFICATION NUMBER: UN 8000
PACKING GROUP: Not Applicable
HAZARD LABEL(S) REQUIRED: Class 9 (Miscellaneous)
PASSENGER & CARGO AIRCRAFT PACKING INSTRUCTION: 910
PASSENGER & CARGO AIRCRAFT MAXIMUM NET QUANTITY/PKG: 25 kg
CARGO AIRCRAFT ONLY PACKING INSTRUCTION: 910
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY/PKG: 25 kg
SPECIAL PROVISIONS: A112
ERG CODE: 9L

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is classified as follows, per rules of the IMO.

UN IDENTIFICATION NUMBER: UN 1950
PROPER SHIPPING NAME: Aerosols
CLASS: 2
SUBSIDIARY RISK: None
PACKING GROUP: Not Applicable
SPECIAL PROVISIONS: 63, 190, 191, 277, 913
HAZARD LABEL(S) REQUIRED: Class 2.1 (Flammable Gas)
LIMITED QUANTITIES: see SP 277
PACKING INSTRUCTION: P003
Ems: F-D, S-U

STOWAGE AND SEGREGATION: Category A Segregation, as per Class 9, but "away from" sources of heat and "separated from" Class 1, except division 1.4.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This is classified as follows, per regulations of the U.N. Economic Commission for Europe.

UN NUMBER: UN 1950
NAME AND DESCRIPTION: Aerosols, flammable
CLASS: 2
CLASSIFICATION CODE: 5F
PACKING GROUP: Not Applicable
LABELS: 2.1
SPECIAL PROVISIONS: 190, 625
LIMITED QUANTITIES: LQ2
PACKING INSTRUCTION: P204
MIXED PACKING INSTRUCTION: MP9
HAZARD IDENTIFICATION NUMBER: S2

15. REGULATORY INFORMATION

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:

COMPOUND	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Isopropanol	NO	NO	YES (Manufacturing /Strong Acid Process Only)

U.S. SARA THRESHOLD PLANNING QUANTITY: No component of this product has specific Threshold Planning Quantities for any component of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: No; FIRE: Yes; REACTIVE: No; SUDDEN RELEASE: No

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

ANSI LABELING (Z129.1) [Precautionary Statements]: CAUTION! KEEP AWAY FROM CHILDREN. FLAMMABLE AEROSOL UNDER PRESSURE. IF RELEASED IN LARGE QUANTITY, A FLAMMABILITY HAZARD MAY RESULT OR MAY REDUCE OXYGEN AVAILABLE FOR BREATHING. MAY CAUSE ADVERSE CENTRAL NERVOUS SYSTEM EFFECTS. Avoid breathing gas, vapor, or mists. Avoid contact with skin, clothing, and eyes. Use only with adequate ventilation. Wash thoroughly in case of contact. Wear gloves, goggles, and appropriate body protection when handling. Do not puncture or incinerate container. Dispose of in accordance with federal, state, and local requirements. **FIRST-AID:** In case of contact, immediately flush skin or eyes for at least 15 minutes with water. Remove contaminated clothing and shoes. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. **IN CASE OF FIRE:** Use fog, foam, dry chemical or carbon dioxide. Refer to Material Safety Data Sheet for additional information on this product.

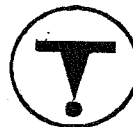
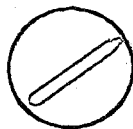
ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: The component of this product is on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Class A: Compressed Gas
Class B5: Flammable Aerosols
Class D2B: Skin or Eye Irritation



EUROPEAN COMMUNITY REGULATIONS:

EC LABELING AND CLASSIFICATION: This product is defined as an Aerosol, as defined in EC Directive, 75/324/EEC. As such containers and packings of this product must be clearly and legibly marked as follows: "Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use. Do not spray on naked flame or any incandescent material".

EC CLASSIFICATION: Due to the overall small amount of product contained in each can (less than 10 mL), no classification of this product is required, per Council Directive 83/265/EEC, 16 May, 1983, Article 6, 6

EC RISK PHRASES: Not applicable.

EC SAFETY PHRASES: Not applicable.

EUROPEAN COMMUNITY ANNEX II HAZARD SYMBOLS: Not applicable.

16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609
February 22, 2005

DATE OF PRINTING:

16. OTHER INFORMATION (Continued)

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. Ultramotive Corporation 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, Ultramotive Corporation, Inc. 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.

DEFINITIONS 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.

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.

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.

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.);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

HEALTH HAZARD (continued):

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).

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].

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

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, 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. *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.);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

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.

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.

DEFINITIONS OF TERMS (Continued)

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. 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 **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_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{ow}** 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. **EC**, European Economic Community).

EUROPE:

EINECS: This is the European Inventory of 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.