

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): NOVUS PLASTIC POLISH #1 (Plastic Clean & Shine, NOVUS No 1)
PRODUCT CODES: 7020V, 7024V, 7026V, 7050V
CHEMICAL NAME/CLASS: Organic Liquid/Water Mixture
U.N. NUMBER: Not Applicable
U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK: Not Applicable
RELEVANT USES of the SUBSTANCE: Clean and Restore Plastic Surfaces
USES ADVISED AGAINST: Other than Relevant Use, Including Glass Polishing

COMPANY/UNDERTAKING IDENTIFICATION:

U.S./DISTRIBUTOR'S NAME: NOVUS, INC.
ADDRESS: 650 Pelham Boulevard, Suite 100
St Paul, MN 55114
1-952-944-8000
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]
TCGI Netherlands B.V.
Nedervonder 7
5061JP Oisterwijk
The Netherlands
31-76-5426000
31-76-5426000
+703-527-3887 (ChemTrec International)
msds-info@novusglass.com
BUSINESS PHONE:
EMERGENCY NUMBER:
EMERGENCY NUMBER (in transport):
EMAIL ADDRESS FOR SDS INFORMATON:
DATE OF PREPARATION: September 8, 2000
DATE OF REVISION: June 24, 2015

EUROPEAN DISTRIBUTOR'S NAME:

ADDRESS:

BUSINESS PHONE:

EMERGENCY NUMBER:

EMERGENCY NUMBER (in transport):

EMAIL ADDRESS FOR SDS INFORMATON:

DATE OF PREPARATION:

DATE OF REVISION:

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: **Product Description:** This product is a milky liquid with a mild alcohol odor. **Health Hazards:** This product may mildly irritate contaminated tissue, especially upon prolonged exposure. **Flammability Hazards:** In the event of a fire, the components of this product may decompose to release irritating vapors and toxic gases (e.g., oxides of silicon and carbon). **Reactivity Hazards:** Negligible. **Environmental Hazards:** Negligible. **Emergency Recommendations:** Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

GLOBAL HARMONIZATION, EU CLP REGULATION (EC) 1272/2208, 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.

Classification: Skin Irritation Category 2, Eye Irritation Category 2A (EU: Eye Irritation Category 2)

Signal Words: Warning

Hazard Statements: H315+H319: Causes skin and serious eye irritation.

Precautionary Statements:

Prevention: P264: Wash thoroughly after handling. P280: Wear protective gloves and eye protection.

Response: P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P332 + P337 + P313: If skin irritation occurs or eye irritation persists, get medical attention. P362: Take off contaminated clothing and wash before reuse. P321: Specific treatment (remove from exposure and treat symptoms).

Storage: not required.

Disposal: not required.

Hazard Symbols/Pictograms: GHS07



2. HAZARD IDENTIFICATION, continued

EU 67/548/EEC LABELING AND CLASSIFICATION: This classified is classified as per European Union Council Directive 67/548/EEC or subsequent Directives. This is a self classification.

Classification: [Xi]: Irritant

Risk Phrases: [R: 36/38]: Irritating to skin and eyes.

Safety Phrases: [S: 2]: Keep away from children. [S: 24/25]: Avoid contact with skin and eyes. [S: 26]: In case of contact with eyes, rinse immediately with plenty of water. [S: 45]: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Hazard Symbol: Xi



3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS or ELNICS #	% w/v	GHS & EU Classification (1272/2008) Risk Phrases/Hazard Statements
Isopropyl Alcohol	67-63-0	200-661-7	1.0-5.0%	GHS & EU CLP: 1272/2008: Classification: Flam Liq Cat. 2, Eye Irr 2, STOT SE 3 Hazard Statement Codes: H225, H319, H336 Hazard Symbols/Pictograms: GHS02, GHS07
Polydimethylsiloxane, Silanol Terminated	70131-67-8	Unlisted	< 5.0%	GHS & EU CLP: 1272/2008: Classification: Not Applicable
Dimethylpolysiloxane	63148-62-9	Unlisted	< 2.0%	GHS & EU CLP: 1272/2008: Classification: Not Applicable
Chlorallyl-triaza-azoniaadamantine Chloride	4080-31-3	Unlisted	0.1-1.0%	GHS & EU CLP: 1272/2008: Classification: Not Applicable
Ethylene Glycol Butyl Ether	111-76-2	203-905-0	0.1-1.0%	GHS & EU CLP: 1272/2008: Classification: Acute Tox 4* (x3), Eye Irr 2, Skin Irr 2 Hazard Statement Codes: H332, H312, H302, H319, H315 Hazard Symbols/Pictograms: GHS07
Ethoxylated Octyl Phenol	9036-19-5	Unlisted	0.1-1.0%	GHS & EU CLP: 1272/2008: Classification: Not Applicable
Water and other components. Each of the other components is present in less than 1 percent concentration (or 0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).			Balance	GHS & EU CLP 1272/2008: Classification: Not applicable.

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

EYE EXPOSURE: If this product enters the eyes, open contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have contaminated individual "roll" eyes. Minimum flushing is for 20 minutes. Contaminated individual must seek medical attention if adverse effect continues after flushing.

INHALATION: If this product is inhaled, remove contaminated individual to fresh air. Contaminated individual must seek medical attention if adverse effects occur.

INGESTION: If this material is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. 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 AND 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: Dermatitis and other pre-existing skin disorders may be aggravated by prolonged overexposure to this product.

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

5. FIRE-FIGHTING MEASURES

FLASH POINT (Pensky-Martens Closed Tester): >93.3°C (> 200°F)

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

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

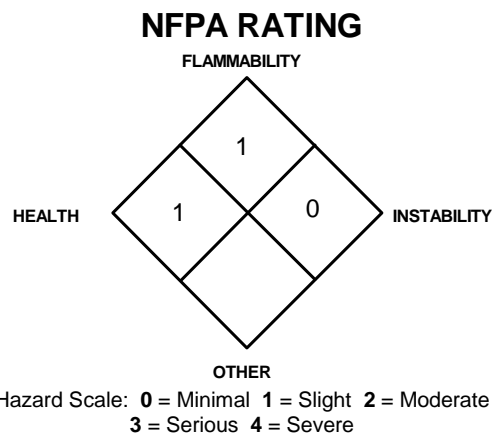
UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE: When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g., oxides of silicon and carbon).

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: Not applicable.

SPECIAL PROTECTIVE ACTIONS FOR FIREFIGHTERS: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.



6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: 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: Use proper protective equipment and non-sparking tools and equipment.

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

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: Access to the spill area should be restricted. Spread should be limited by diking spill area. Absorb spilled liquid with polypads or other suitable absorbent materials.

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. Material should be stored in secondary containers or in a diked area, as appropriate. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours. Storage areas should be made of fire resistant materials. Have appropriate extinguishing equipment in the storage area (such as sprinkler systems or portable fire extinguishers). Empty containers may contain residual product; therefore, empty containers should be handled with care.

SPECIFIC END USE(S): This product is used for cleaning and restoring plastic surfaces. Follow all industry standards for use of this product.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:

Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment thoroughly, before maintenance begins. Collect all rinsates and dispose of according to applicable standards.

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 ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	
Chlorallyl-triaza-azoniaadamantine Chloride	4080-31-3	NE	NE	NE	NE	NE	NE	NE	NE
Dimethylpolysiloxane	63148-62-9	NE	NE	NE	NE	NE	NE	NE	NE
Ethylene Glycol Butyl Ether	111-76-2	20	NE	50 (skin) 25 (vacated 1989 PEL)	NE	5 (skin)	NE	3000	DFG MAKs: TWA = 20 (skin) PEAK = 4•MAK 15 min. average value, 1-hr interval DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-C, EPA- CBD, IARC-3, TLV-A3
Ethoxylated Octyl Phenol	9036-19-5	NE	NE	NE	NE	NE	NE	NE	NE
Isopropyl Alcohol	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 DFG MAK Pregnancy Risk Classification: C Carcinogen: IARC-3, TLV- A4
Polydimethylsiloxane, Silanol Terminated	70131-67-8	NE	NE	NE	NE	NE	NE	NE	NE
Water and other components. Each of the other components is present in less than 1 percent concentration (or 0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		None of the other components of this product contribute significant, additional, hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian Workplace Hazardous Materials Identification System Standards (CPR 4) and European Community Standards (Commission Directive 93/112/EEC) and subsequent Directives.							

NE = Not Established.

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

2-BUTOXYETHANOL:

Australia: TWA = 25 ppm (120 mg/m³), Skin, JAN 1993
 Austria: MAK = 20 ppm (100 mg/m³), Skin, JAN 1999
 Belgium: TWA = 25 ppm (121 mg/m³), Skin, JAN 1993
 Denmark: TWA = 25 ppm (120 mg/m³), Skin, JAN 1999
 Finland: TWA = 25 ppm (120 mg/m³), STEL 75 ppm (350 mg/m³), Skin, JAN 1999
 France: VME = 25 ppm (120 mg/m³), Skin, JAN 1999
 Germany: MAK = 20 ppm (100 mg/m³), Skin, JAN 1999
 Hungary: TWA = 100 mg/m³, STEL 200 mg/m³, Skin, JAN 1993
 The Netherlands: MAC-TGG = 20 ppm (100 mg/m³), STEL = 40 ppm, Skin, JAN 1999
 Norway: TWA = 20 ppm (100 mg/m³), JAN 1999
 The Philippines: TWA = 50 ppm (240 mg/m³), Skin, JAN 1993
 Poland: MAC(TWA) = 100 mg/m³, MAC(STEL) 360 mg/m³, JAN 1999
 Russia: STEL = 5 mg/m³, JAN 1993
 Sweden: NGV = 10 ppm (50 mg/m³), KTV 20 ppm (100 mg/m³), Skin, JAN 1999
 Switzerland: MAK-W = 20 ppm (100 mg/m³), KZG-W = 40 ppm (200 mg/m³), Skin, JAN 1999
 Turkey: TWA = 50 ppm (240 mg/m³), JAN 1993
 United Kingdom: TWA = 25 ppm (123 mg/m³), Skin, SEP 2000
 In Argentina, Bulgaria, Colombia, Jordan, Korea, New Zealand, Singapore, Vietnam, New Zealand, Singapore, Vietnam check ACGIH TLV

ISOPROPYL ALCOHOL:

Australia: TWA = 400 ppm (980 mg/m³), STEL = 500 ppm, JAN 1993
 Austria: MAK = 400 ppm (980 mg/m³), JAN 1999
 Belgium: TWA = 400 ppm (985 mg/m³), STEL = 500 ppm, JAN 1993
 Denmark: TWA = 200 ppm (490 mg/m³), JAN 1999
 France: VLE = 400 ppm, JAN 1999
 Germany: MAK = 400 ppm (980 mg/m³), JAN 1999
 Japan: STEL = 400 ppm (980 mg/m³), JAN 1999
 The Netherlands: MAC-TGG = 650 mg/m³, 2003
 The Philippines: TWA = 400 ppm (980 mg/m³), JAN 1993
 Poland: MAC(TWA) = 900 mg/m³, MAC(STEL) = 1200 mg/m³, JAN 1999
 Russia: STEL = 10 mg/m³, STEL = 50 mg/m³, JUN 2003
 Sweden: NGV = 150 ppm (350 mg/m³), KTV = 250 ppm (600 mg/m³), JAN 1999
 Switzerland: MAK-W = 400 ppm (980 mg/m³), KZG-W = 800 ppm (1960 mg/m³), JAN 1999
 Turkey: TWA = 200 ppm (500 mg/m³), JAN 1993
 United Kingdom: TWA = 400 ppm (999 mg/m³), STEL = 500 ppm (1250 mg/m³), SEP 2000
 In Argentina, Bulgaria, Colombia, Jordan, Korea, New Zealand, Singapore, Vietnam, New Zealand, 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.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION: Maintain the Oxygen level above 19.5% in the workplace and exposure limits below levels given earlier in this section, if applicable. 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 assist in equipment selection. The following are NIOSH respiratory protection guidelines for Isopropanol. These guidelines are given to assist in selection of respiratory protective equipment.

ISOPROPANOL

CONCENTRATION

Up to 2000 mg/m³:

RESPIRATORY EQUIPMENT

Supplied Air Respirator (SAR) operated in a continuous flow mode or powered air-purifying respirator with organic vapor cartridge, full facepiece chemical cartridge respirator with organic vapor cartridge(s), gas mask with organic vapor cartridge, powered air-purifying respirator with tight fitting facepiece and organic vapor cartridge(s), full facepiece Self-Contained Breathing Apparatus (SCBA), or full facepiece SAR.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:

Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Escape:

Gas mask with organic vapor canister or 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. If necessary, refer to applicable regulations and standards.

BODY PROTECTION: Use body protection appropriate for task. If necessary, refer to appropriate regulations to assist in equipment selection.

9. PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE: Thin liquid.

MOLECULAR FORMULA: Mixture.

ODOR: Faint.

RELATIVE VAPOR DENSITY (air = 1): Not established.

SPECIFIC GRAVITY (water = 1): 1.01

SOLUBILITY IN WATER: Soluble.

VAPOR PRESSURE, mm Hg @ 50°C: Not established.

% VOLATILE: <8

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

HOW TO DETECT THIS SUBSTANCE (identification/warning properties): The appearance may act as a distinguishing characteristic of this product if accidentally released.

COLOR: Milky white.

MOLECULAR WEIGHT: Mixture.

ODOR THRESHOLD: Not established.

EVAPORATION RATE (nBuAc = 1): < 1.0

MELTING/FREEZING POINT: Not established.

BOILING POINT: Not established.

pH: Not established.

10. STABILITY and REACTIVITY

CHEMICAL STABILITY: Stable under typical, environmental conditions in a workplace in the absence of contaminants.

DECOMPOSITION PRODUCTS: *Combustion:* Silicon, nitrogen and carbon oxides. *Hydrolysis:* None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, water-reactive materials.

POSSIBILITY OF HAZARDOUS REACTIONS: None known.

CONDITIONS TO AVOID: Exposure to incompatible chemicals, high temperatures.

11. TOXICOLOGICAL INFORMATION

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

INHALATION: Inhalation is not anticipated to be a significant route of overexposure to this product. If mists or sprays of this product are inhaled, they may mildly irritate the nose and other tissues of the upper respiratory system. Symptoms are generally alleviated upon breathing fresh air.

CONTACT WITH SKIN or EYES: Depending on the duration and concentration of overexposure, eye contact may cause tearing and redness. Skin contact may cause mild redness, discomfort, and irritation. Symptoms are generally alleviated upon rinsing. Repeated skin contact may cause dermatitis (dry, red skin).

SKIN ABSORPTION: Although the Isopropyl Alcohol component of this product can be absorbed through intact skin, skin absorption is not anticipated to cause adverse 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.

INJECTION: Though not anticipated to be a likely route of occupational exposure, injection of this material (via puncture or laceration by a contaminated object) may cause local reddening, tissue swelling, and discomfort in addition to the wound.

11. TOXICOLOGICAL INFORMATION

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.

ACUTE: This material may irritate the eyes, skin, and mucous membranes. Inhalation of mists or sprays of this product may irritate the nose and other tissues of the upper respiratory system.

CHRONIC: Repeated skin contact may cause dermatitis (dry, red skin). See below for additional information on the components of this product.

TARGET ORGANS: ACUTE: Skin, eyes. CHRONIC: Skin.

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

1-(3-CHLOROALLYL)-3,5,7-TRIAZA-1-AZONIAADAMANTANE CHLORIDE:

TDLo (Skin-Human) 2 pph: Skin and Appendages: dermatitis, allergic (after topical exposure)

TDLo (Skin-Human) 2 pph/48 hours-continuous: Skin and Appendages: dermatitis, allergic (after topical exposure)

Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Mild

LD₅₀ (Oral-Rat) 500 mg/kg

LD₅₀ (Oral-Rabbit) 78,500 µg/kg

LD₅₀ (Oral-Guinea Pig) 710 mg/kg

LD₅₀ (Oral-Chicken) 2 gm/kg

LD₅₀ (Skin-Rabbit) 565 mg/kg

LC₅₀ (Skin-Rat) > 4.7 mg/kg: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Rat) 250 mg/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: eye/ear, other developmental abnormalities

TDLo (Skin-Rabbit) 1500 mg/kg/3 weeks-intermittent: Brain and Coverings: changes in brain weight; Related to Chronic Data: changes in testicular weight

TDLo (Skin-Rabbit) 1500 mg/kg/30 days-intermittent: Liver: other changes

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 333 µg/plate

DIMETHYLPOLYSILOXANE:

Eye Irritancy (rabbit) = 100 mg/1H; mild

TDLo (subcutaneous, mouse) = 120 g/kg; Equivocal tumorigenic agent

TDLo (subcutaneous, rat) = 10 g/kg/female 6-15 days after conception; Reproductive, Specific Developmental Abnormalities: musculoskeletal system

TDLo (subcutaneous, rat) = 8 g/kg/female 15-22 days after conception; Reproductive, Effects on Newborn: stillbirth

TDLo (subcutaneous, rabbit) = 260 mg/kg/female 6-18 days after conception; Reproductive, Effects on Embryo or Fetus: fetal death; Reproductive, Specific Developmental Abnormalities: body wall

LD (oral, rat) > 50 mL/kg

LD₅₀ (oral, rat) > 24 g/kg; Gastrointestinal: hypermotility, diarrhea

LD₅₀ (oral, rat) > 17 g/kg; Kidney, Ureter, Bladder: other changes; Nutritional and Gross Metabolic: other changes

LD (skin, rabbit) > 20 mL/kg; Details of toxic effects not reported other than lethal dose value

LD₅₀ (skin, rabbit) > 2 g/kg; Behavioral: food intake (animal); Gastrointestinal: hypermotility, diarrhea; Skin and Appendages: dermatitis, other (after systemic exposure)

ETHYLENE GLYCOL BUTYL ETHER:

Open Irritation Test (Skin-Rabbit) 500 mg: Mild

Standard Draize Test (Eye-Rabbit) 100 mg: Severe

Standard Draize Test (Eye-Rabbit) 100 mg/24 hours: Moderate

LDLo (Oral-Human) 143 mg/kg

TDLo (Oral-Woman) 600 mg/kg: Behavioral: coma; Lungs, Thorax, or Respiration: dyspnea; Nutritional and Gross Metabolic: metabolic acidosis

TDLo (Oral-Woman) 7813 µL/kg: Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Nutritional and Gross Metabolic: metabolic acidosis

ETHYLENE GLYCOL BUTYL ETHER (continued):

TCLo (Inhalation-Human) 195 ppm/8 hours: Gastrointestinal: nausea or vomiting

TCLo (Inhalation-Human) 100 ppm: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): effect, not otherwise specified; Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Human) 1500 mg/m³: Sense Organs and Special Senses (Eye): conjunctive irritation; Liver: other changes; Kidney/Ureter/Bladder: other changes

LC₅₀ (Inhalation-Rat) 450 ppm/4 hours: Behavioral: ataxia; Nutritional and Gross Metabolic: weight loss or decreased weight gain

FURTHER INFORMATION AVAILABLE UPON REQUEST.

ETHOXYLATED OCTYL PHENOL:

Standard Draize Test (Eye-Rabbit) 1%: Severe

LD₅₀ (Oral-Rat) 4190 mg/kg

LD₅₀ (Oral-Mouse) 3500 mg/kg

LD₅₀ (Intraperitoneal-Rat) 770 mg/kg

LD₅₀ (Intravenous-Mouse) 70 mg/kg

TDLo (Oral-Mouse) 8750 mg/kg/30 days-intermittent: Related to Chronic Data: death

TDLo (Skin-Mouse) 600 mg/kg/4 weeks-intermittent: Related to Chronic Data: death, changes in ovarian weight, changes in testicular weight

DNA Inhibition (Human-Lymphocyte) 5 ppm

DNA Inhibition (Mouse Cells-Not Otherwise Specified) 10 ppm

Mutation Test Systems-Not Otherwise Specified (Intraperitoneal-Rat) 870 mg/kg

Mutation Test Systems-Not Otherwise Specified (Oral-Rat) 10,200 mg/kg

ISOPROPYL ALCOHOL:

Skin Irritancy (rabbit) = 500 mg; mild

Eye Irritancy (rabbit) = 100 mg; severe

Eye Irritancy (rabbit) = 16 mg

Cytogenetic Analysis (inhalation, rat) = 1030 µg/m³/16 weeks/intermittent

Eye Irritancy (rabbit) = 10 mg; moderate

Cytogenetic Analysis (*Saccharomyces cerevisiae*) = 200 mmol/tube

TDLo (oral, rat) = 6480 mg/kg/male 26 weeks pre; Reproductive effects

TCLo (inhalation, rat) = 10,000 ppm/7 hours/female 1-19 days post; Teratogenic effects

LD₅₀ (oral, rat) = 5045 mg/kg

LDLo (inhalation, rat) = 16,000 ppm/4 hours

LD₅₀ (intraperitoneal, rat) = 2735 mg/kg

LD₅₀ (intravenous, rat) = 1099 mg/kg

LD₅₀ (oral, mouse) = 3600 mg/kg

LDLo (inhalation, mouse) = 12,800 ppm/3 hours

LD₅₀ (intraperitoneal, mouse) = 4477 mg/kg

LDLo (subcutaneous, mouse) = 6000 mg/kg

LD₅₀ (intravenous, mouse) = 1509 mg/kg

LDLo (oral, dog) = 1537 mg/kg; Gastrointestinal: nausea or vomiting

LDLo (intravenous, dog) = 5120 mg/kg

LDLo (oral, cat) = 6 mL/kg

LDLo (intravenous, cat) = 1963 mg/kg

LD₅₀ (oral, rabbit) = 6410 mg/kg



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
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FLAMMABILITY HAZARD	(RED)	1
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PHYSICAL HAZARD	(YELLOW)	0
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PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate

3 = Serious 4 = Severe * = Chronic hazard

ISOPROPYL ALCOHOL (continued):

LD₅₀ (skin, rabbit) = 12,800 mg/kg

LD₅₀ (intraperitoneal, rabbit) = 667 mg/kg

LD₅₀ (intravenous, rabbit) = 1184 mg/kg

LD₅₀ (intraperitoneal, guinea pig) = 2560 mg/kg

LD₅₀ (intraperitoneal, hamster) = 3444 mg/kg

LDLo (parenteral, frog) = 20 g/kg; Peripheral Nerve and Sensation: spastic paralysis with or without sensory change; Behavioral: somnolence (general depressed activity)

TDLo (oral, man) = 14,432 mg/kg; Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: dyspnea

TDLo (oral, human) = 223 mg/kg; Behavioral: hallucinations, distorted perceptions; Cardiac: pulse rate; Vascular: BP lowering not characterized in autonomic section TDLo (oral, infant) = 13 gm/kg; Behavioral: somnolence (general depressed activity), irritability; Gastrointestinal: nausea or vomiting

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, man) = 2770 mg/kg

POLYDIMETHYLSILOXANE, SILANOL

TERMINATED:

LD₅₀ (oral, rat) > 64 mL/kg; Gastrointestinal: other changes; Liver: other changes; Nutritional and Gross Metabolic: other changes

LD₅₀ (oral, rat) >15,400 mg/kg; Sense Organs and Special Senses (Eye): ptosis; Behavioral: somnolence (general depressed activity); Kidney, Ureter, Bladder: urine volume increased

LC₅₀ (inhalation, rat) > 8750 mg/m³/7 hours; Lungs, Thorax, or Respiration: other changes

LD₅₀ (skin, rabbit) > 16 mL/kg; Kidney, Ureter, Bladder: other changes; Nutritional and Gross Metabolic: other changes

LD₅₀ (skin, rabbit) > 2 g/kg

11. TOXICOLOGICAL INFORMATION (Continued)

CARCINOGENIC POTENTIAL OF COMPONENTS: Components of this product are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

ETHYLENE GLYCOL BUTYL ETHER: EPA-C (Possible Human Carcinogen); EPA-CBD (Cannot Be Determined); IARC-3 Compound (Not Classifiable as to Carcinogenicity to Humans); TLV-A3 (Confirmed Animal Carcinogen with Unknown Relevance to Human)

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

The remaining components 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.

IRRITANCY OF PRODUCT: This product may mildly irritate contaminated eyes, skin, and mucous membranes.

SENSITIZATION TO THE PRODUCT: The components of this product are not known to be skin or respiratory sensitizers.

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

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Animal mutation data are available for the Isopropyl Alcohol component of this product; these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans. The Isopropanol component has produced fetotoxicity (reduced fetal weight) in rats exposed by inhalation, in the absence of maternal toxicity. Reduced survival in the early postnatal period has been observed in the offspring of rats exposed to high oral doses, in the presence of minimal maternal toxicity. Rats were exposed by inhalation to 0, 3500, 7000 or 10000 ppm during days 1-19 of pregnancy. Maternal toxicity was observed at the 2 high doses, but not at 3500 ppm. Fetal weights were significantly reduced in a concentration related manner at all treatment levels. At 7000 and 10000 ppm, teratogenicity and/or embryotoxicity were observed.

Reproductive Toxicity: This product is not reported to cause reproductive effects in humans. In a two-generation study of Isopropanol, rats were orally dosed with 0, 100, 500 or 1000 mg/kg/day for 10 weeks prior to mating. Females were dosed during mating, gestation and lactation and males were dosed during mating through delivery of the last litter sired. In the first generation, a significant reduction was observed in the live birth index and the survival index on days 1 and 4 for the offspring of animals exposed to 1000 mg/kg/day, as well as the survival rate of off-spring. Only minimal maternal toxicity (increased liver weight) was observed at 500 mg/kg/day. At 1000 mg/kg/day, 2/30 females in the first generation (P1) and 2/26 females died in the second generation.

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

CHEMICAL: DETERMINANT	SAMPLING TIME	BEI
Isopropanol • Acetone in urine	• End of Shift End of Workweek	• 40 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.

PERSISTENCE AND BIODEGRADABILITY: The product has not been tested for persistence or biodegradability. The components of this product are relatively stable under ambient environmental conditions. Additional environmental data for components of this product are available as follows:

DIMETHYLPOLYSILOXANE:

Water Solubility: Insoluble.

Terrestrial Fate: If released to soil, Dimethyl Siloxane will absorb strongly and will remain essentially immobile. Dimethyl Siloxane will not volatilize to the atmosphere, nor will it biodegrade. Dimethyl Siloxane will not undergo hydrolysis except in clay soils which are known to catalyze this reaction at a rate dependent upon the amount of water present.

Aquatic Fate: If released to an aquatic environment, Dimethyl Siloxane is expected to absorb strongly to sediment and suspended organic matter. Although insoluble in water, Dimethyl Siloxane is not expected to bioconcentrate, due to its inherent hydrophobicity. Dimethyl Siloxane will not bioconcentrate in fish and aquatic environments as this compound is molecularly too large to pass through biological membranes and concentrate in fatty tissue. Dimethyl Siloxane will hydrolyze in water and will not volatilize to the atmosphere.

Atmospheric Fate: If released to the atmosphere, Dimethyl Siloxane will only enter the atmosphere if in aerosol form, due to its heavy molecular weight, very low vapor pressure and liquid physical state. The most likely atmospheric fate process is by dry deposition to the surface of the earth.

ISOPROPYL ALCOHOL:

Octanol/Water Partition Coefficient: Log P = 0.34–0.5

Persistence: If released to the soil, Isopropanol will both rapidly evaporate and leach into the ground due to high vapor pressure and low adsorption to soil. If released to water, Isopropanol will volatilize, with an estimated half-life of 5.4 days. If released to the atmosphere, Isopropanol will photodegrade, with an estimated half-life of one to several days. Due to the solubility of Isopropanol in water, rainout may be significant.

Biodegradation: In soil, and water, degradation of Isopropanol has not been determined. If soil degradation is not rapid, it will likely leach to groundwater.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential.

12. ECOLOGICAL INFORMATION, continued

ECOTOXICITY: This product may be harmful or fatal to contaminated aquatic plant and animal life. Additional aquatic toxicity data for components of this product are provided as follows:

ISOPROPYL ALCOHOL:

Toxic (*Chlorella pyrenoidosa* algae) = 17,400 mg/L
NOEC (*Daphnia magna*) reproduction = 2,100 mg/L
NOEC (*Daphnia magna*) growth = 757 mg/L
EC₀ (*Pseudomonas putida*, bacteria) 16 hours = 1,050 mg/L
EC₀ (*Microcystis aeruginosa*, algae) 8 days = 1,000 mg/L
EC₀ (*Scenedesmus quadricauda*, green algae) 7 days = 1,800 mg/L
EC₅₀ (*Daphnia magna*) reproduction = 3,010 mg/L
EC₀ (*Uronema parducci* Chatton-Lwoff, protozoa) = 3,425 mg/L
LC₀ (*Semolitus atromaculatus*, creek chub) 24 hours = 900 mg/L

ISOPROPYL ALCOHOL (continued):

EC₅₀ (*Entosiphon sulcatum*, protozoa) 72 hours = 4,930 mg/L
EC₅₀ Microtox™ (*Photobacterium*) test 5 minutes = 22,800 mg/L
LC₅₀ Streptokit F (*Streptocephalus proboscideus*) test 24 hours = 11,600 mg/L
LC₅₀ (*Daphnia magna*) test 24 hours = 9500 mg/L
LC₅₀ Rotoxkit F (*Brachionus calyciflorus*) test 24 hours = 28,600 mg/L
LC₅₀ (*Crangon crangon*, brown shrimp) 48 hours = (average) 1,400 mg/L
LC₅₀ (*Crangon crangon*, brown shrimp) 48 hours = (range) 900-1,950 mg/L

ISOPROPYL ALCOHOL (continued):

LC₅₀ (*Crangon crangon*, brown shrimp) 98 hours = (average) 1,150 mg/L
LC₅₀ (*Crangon crangon*, brown shrimp) 98 hours = (range) 750-1,650 mg/L
LC₅₀ (*Daphnia magna*) = 4,600 mg/L
LC₅₀ (*Crassus auratus*, goldfish) 24 hours = > 500 mg/L
LC₅₀ (*Pimephales promelas*, fathead minnow) 1; 24; 48; 72 and 96 hours = 11,830; 11,160; 11,130; 11,130; 11,130 mg/L
LC₅₀ (*Poecilia reticulata*, guppy) 7 days = 7,060 mg/L
LC₁₀₀ (creek chub) 24 hours = 1,100 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 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. 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.

EWC WASTE CODE: 16 10 02 aqueous liquid wastes other than those mentioned in 16 10 01

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.

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.

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

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are not 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)
Ethylene Glycol Butyl Ether (under generic glycol ether category)	No	No	Yes
Isopropyl Alcohol (mfg-strong acid process)	No	No	Yes
Polyethylene Glycol Nonylphenol (under generic glycol ether category)	No	No	Yes

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

U.S. CERCLA REPORTABLE QUANTITY (RQ): Under the generic Glycol Ether category, the Ethylene Glycol Butyl Ether and Polyethylene Glycol Nonylphenol are CERCLA Hazardous Substances although they have not been assigned a specific CERCLA RQ.

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

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

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/NDL INVENTORY: The components of this product are listed on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITY SUBSTANCES LISTS: Not applicable.

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): CAUTION! MAY CAUSE SKIN AND EYE IRRITATION. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing sprays or mists. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves and eye protection. **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

NOVUS INC. CHEMISTRY DEPARTMENT • 650 Pelham Boulevard, Suite 100 • St Paul, MN 55114 (952) 944-8000

REFERENCES AND DATA SOURCES: Contact the supplier for information.

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.

REVISION DETAILS: July 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, Inc 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, 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.

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

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 aenuegenic 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 a 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 LD₅₀ Rat 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 LD₅₀ Rat or Rabbit:** > 1000-2000 mg/kg. **Inhalation Toxicity LC₅₀ 4-hrs Rat:** > 2-20 mg/L.; **2 (Moderate Hazard):** Temporary or transitory injury may occur. **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 LD₅₀ Rat or Rabbit:** > 200-1000 mg/kg. **Inhalation Toxicity LC₅₀ 4-hrs Rat:** > 0.5-2 mg/L.; **3 (Serious Hazard):** Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. **Skin Irritation:** Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue.

HEALTH HAZARD (continued):

3 (continued): Eye Irritation: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. **Oral Toxicity LD₅₀ Rat:** > 1-50 mg/kg. **Dermal Toxicity LD₅₀ Rat or Rabbit:** > 20-200 mg/kg. **Inhalation Toxicity LC₅₀ 4-hrs Rat:** > 0.05-0.5 mg/L.; **4 (Severe Hazard):** Life-threatening; major or permanent damage may result from single or repeated exposure. **Skin Irritation:** Not appropriate. Do not rate as a "4", based on skin irritation alone. **Eye Irritation:** Not appropriate. Do not rate as a "4", based on eye irritation alone. **Oral Toxicity LD₅₀ Rat:** ≤ 1 mg/kg. **Dermal Toxicity LD₅₀ Rat or Rabbit:** ≤ 20 mg/kg. **Inhalation Toxicity LC₅₀ 4-hrs Rat:** ≤ 0.05 mg/L).

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); 1 (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; 2 (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, Including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors); 3 (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); 4 (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric].

PHYSICAL HAZARD:

0 (Water Reactivity): Materials that do not react with water. **Organic Peroxides:** Materials that are normally stable, even under fire conditions and will not react with water. **Explosives:** Substances that are Non-Explosive. **Unstable Compressed Gases:** No Rating. **Pyrophorics:** No Rating. **Oxidizers:** No "0" rating allowed. **Unstable Reactives:** Substances that will not polymerize, decompose, condense or self-react.; **1 (Water Reactivity):** Materials that change or decompose upon exposure to moisture. **Organic Peroxides:** Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. **Explosives:** Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. **Compressed Gases:** Pressure below OSHA definition. **Pyrophorics:** No Rating. **Oxidizers:** Packaging Group III; **Solids:** any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. **Liquids:** any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. **Unstable Reactives:** Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.; **2 (Water Reactivity):** Materials that may react violently with water. **Organic Peroxides:** Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. **Explosives:** Division 1.4 – Explosive substances where the explosive effect is largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. **Compressed Gases:** Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. **Pyrophorics:** No Rating. **Oxidizers:** Packaging Group II **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.

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

2 (continued): 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 \geq 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. **Oxidizers:** **Liquids:** Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. **Unstable Reactives:** Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.; **4 (Water Reactivity):** Materials that react explosively with water without requiring heat or confinement. **Organic Peroxides:** Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. **Explosives:** Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. **Compressed Gases:** No Rating. **Pyrophorics:** Add to the definition of Flammability “4”. **Oxidizers:** No “4” rating. **Unstable Reactives:** Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: 0 (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. **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.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

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 up 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.

DEFINITIONS OF TERMS (Continued)

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 **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_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA:

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.