

MATERIAL SAFETY DATA SHEET

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

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):

STARBRITE COLOR RESTORER

PART NUMBER:

81816PW, 81816PC

CHEMICAL NAME/CLASS:

Aqueous Siloxane/Petroleum Distillate Mixture

PRODUCT USE:

Polish

U.S. MANUFACTURER'S NAME:

STAR BRITE DIST.

ADDRESS:

4041 S.W. 47 Avenue
Ft. Lauderdale, FL 33314

PHONE:

(954) 587-6280

BUSINESS PHONE:

(800) 327-8583

EMERGENCY PHONE:

Chemtrec (24 hrs)

1-800-424-9300 (U.S., Canada, Puerto Rico, U.S Virgin Islands)

+ 1-703-527-3887 (Outside North America)

DATE OF PREPARATION:

January 4, 2010

NOTE: ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards and Canadian WHMIS [Controlled Products Regulations] required information is included in appropriate sections based on the U.S. ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Product Description: This product is a white, slightly viscous liquid with a characteristic petroleum odor. **Health Hazards:** Irritating to eyes, respiratory system and skin. Prolonged or repeated inhalation of mists vapors or fumes may cause lung damage. Prolonged skin exposure may cause blistering. Prolonged eye exposure to fumes or mists or sprays may cause temporary vision disturbances (light around eyes). Harmful or fatal if swallowed. **Flammability Hazards:** This product is combustible and can be ignited if exposed to high temperature or direct flame. If involved in a fire, this product can produce carbon oxides, nitrogen oxides, sulfur oxides and formaldehyde. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** This product can be harmful or fatal to contaminated plant, animal, and aquatic life. **Emergency Recommendations:** Emergency responders must wear the personal protective equipment suitable for the situation to which they are responding.

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w
Morpholine	110-91-8	0.0-2.0%
Hydrotreated Light Petroleum Distillate	64742-47-8	1.0-5.0%
Nepheline Syenite	37244-96-5	1.0-5.0%
Polydimethylsiloxane	63148-62-9	1.0-5.0%
Tall Oil Fatty Acids	61790-12-3	1.0-5.0%
Kaolin	1332-58-7	1.0-10.0%
Kerosene	8008-20-6	10.0-15.0%
Water	7732-18-5	Balance

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

4. FIRST-AID MEASURES

Contaminated individuals must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Remove or cover gross contamination to avoid exposure to rescuers. Take a copy of label and MSDS to health professional with the contaminated individual.

SKIN EXPOSURE: If this product contaminates the skin, immediately begin decontamination with running water. Flooding quantities of water should be used. Minimum flushing is for 20 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The contaminated individual must seek immediate medical attention if any adverse health effect occurs.

EYE EXPOSURE: If this product enters the eyes, open the contaminated individual's eyes while under gently running water. Flooding quantities of water should be used. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. Minimum flushing is for 20 minutes. The contaminated individual must seek immediate medical attention.

INHALATION: If mists or sprays from this product are inhaled, remove the contaminated individual to fresh air. If necessary, use artificial respiration to support vital functions.

4. FIRST-AID MEASURES (Continued)

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Have victim rinse mouth with water if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position if possible) to maintain an open airway and prevent aspiration.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting dermatitis or other skin disorders may be aggravated by exposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: [TCC]: 71.1°C (160°F); [PMCC]: 66.7°C (152°F)

AUTOIGNITION TEMPERATURE: 282.2°C (540°F)

FLAMMABLE LIMITS (in air by volume, %): LEL: 0.9% UEL: 7.0%

FIRE EXTINGUISHING MATERIALS: Fires of this product can be fought with water spray, carbon dioxide, foam, dry chemical, halon and any 'ABC' extinguishers.

FIRE EXTINGUISHING MATERIALS NOT TO BE USED: None known.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is combustible.

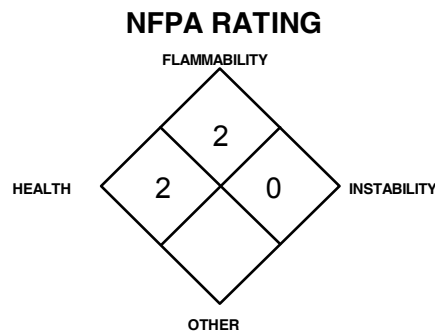
This product may present a contact hazard to firefighters. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g. carbon oxides, nitrogen oxides, sulfur oxides and formaldehyde).

The vapors may travel to a source of ignition, and flashback to a leak or open container.

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: May be sensitive.

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



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

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. Combustible vapor levels must be below 10% of the LEL (See Section 5. Fire-Fighting Measures) before personnel are permitted to enter the area. 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 non-response personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA).

Small Spills: Absorb spilled liquid with activated carbon, polypads, or other suitable inert absorbent materials, wearing gloves, goggles and apron. Avoid contact with spill and water. Place spilled material in appropriate container for disposal, sealing tightly. Remove all residue before decontamination of spill area.

Large Spills: Minimum Personal Protective Equipment should be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), Tyvek or other protective clothing and boots, hard hat, and Self-Contained Breathing Apparatus**. For large spills, dike or otherwise contain spill and remove with vacuum truck or pump to storage/salvage vessels. Decontaminate the area thoroughly. Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Monitor area for combustible vapor levels and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, and that levels are below applicable LELs (see Section 5 – Fire Fighting Measures) before non-response personnel are allowed into the spill area.

Place all spill residue in a double plastic bag, 55-gallon drum or other containment and seal. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements.

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

7. HANDLING and STORAGE

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

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES: Use in a well-ventilated location, segregated from other materials and operations. Keep away from heat, sparks, and other sources of ignition. Use non-sparking tools. Transfers of this product must be free of moisture or water. Bond and ground containers during transfers of material. Containers of this product must be properly labeled. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). 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 (such as sprinkler systems or 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.

PRODUCT USE: This product is used as a plastic polish. Follow all industry standard for storage, use and handling.

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

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided later in this Section, if applicable. If existing ventilation is not adequate, product should be used with a local exhaust hood, or in ductless fume hood/portable ventilation system. All ventilation systems should pull air at or below the open container in order to pull vapors away from the person using the product. Ensure eyewash/safety shower stations are available near areas where this product is used.

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	mg/m ³
Hydrotreated Light Petroleum Distillate Exposure limits are for Kerosene	64742-47-8	200 (as total hydrocarbon vapor) skin	NE	NE	NE	100	NE	NE	Carcinogen: IARC-3
Kaolin	1332-58-7	2 (resp. fraction)	NE	15 (total dust), 5 (resp. fraction) Vacated 1989 PEL: 10 (total dust)	NE	10 (total dust), 5 (resp. fraction)	NE	NE	Carcinogen: TLV-A4
Kerosene	8008-20-6	200 (as total hydrocarbon vapor) skin	NE	NE	NE	100	NE	NE	Carcinogen: IARC-3
Morpholine	110-91-8	71 (skin)	NE	71 (skin)	105 (vacated 1989 PEL)	70 (skin)	105 (skin)	1400 (based on 10% of LEL)	DFG MAKs: TWA = 36 PEAK = 2•MAK 15 min. average value, 1-hr interval, 4-per shift DFG MAK Pregnancy Risk Classification: D Carcinogen: IARC-3, TLV-A4
Nepheline Syenite	37244-96-5	NE	NE	NE	NE	NE	NE	NE	NE
Polydimethylsiloxane	63148-62-9	NE	NE	NE	NE	NE	NE	NE	NE
Tall Oil Fatty Acids	61790-12-3	NE	NE	NE	NE	NE	NE	NE	NE
Water	7732-18-5	NE	NE	NE	NE	NE	NE	NE	NE

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

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with regulations found in U.S. OSHA 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-07). Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards and Canadian CSA Standard Z94.4-02. 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).

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION (continued): The following are NIOSH respiratory equipment recommendations for Kerosene and should be considered in event use produces significant mists, sprays or fumes.

KEROSENE

<u>CONCENTRATION</u>	<u>RESPIRATORY PROTECTION</u>
----------------------	-------------------------------

Up to 1000 mg/m ³ :	Any Chemical Cartridge Respirator with organic vapor cartridge(s), or any Supplied-Air Respirator (SAR), or any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s).
--------------------------------	--

Up to 5000 mg/m ³ :	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 PAPR with a tight-fitting facepiece and organic vapor cartridge(s), or any Self-Contained Breathing Apparatus with a full facepiece, or any SAR.
--------------------------------	--

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: Not normally needed under normal conditions of handling. If mists or sprays are present from product, wear splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or the Canadian CSA Standard Z94.3-07.

HAND PROTECTION: Wear Nitrile rubber, Polyethylene, Viton™ gloves for routine industrial use. Natural rubber and butyl rubber gloves are not recommended. Resistance of specific materials can vary from product to product. Evaluate resistance under conditions of use and maintain clothing carefully. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. Wash hands before putting on gloves and after removing gloves. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task (e.g., coveralls or apron). If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-M1984, *Protective Footwear*.

9. PHYSICAL and CHEMICAL PROPERTIES

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

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

SPECIFIC GRAVITY @ 20°C (water = 1): 1.03-1.04

MELTING/FREEZING POINT: ~0°C (~32°F)

SOLUBILITY IN WATER @ 20°C: > 0.1%

BOILING POINT: Not available.

VAPOR PRESSURE: Not available.

pH: 9.2-9.5

ODOR THRESHOLD: Not determined.

VISCOSITY @ 20°C: 680 cps

PERCENT VOLATILE: 0% by weight

VOC/VOLUME: 15.3 wt.%

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

APPEARANCE, ODOR and COLOR: This is a white, slightly viscous liquid with a characteristic petroleum odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance and odor may be distinguishing characteristics to identify the product in event of accidental release.

10. STABILITY and REACTIVITY

STABILITY: Stable under conditions of normal temperature and pressure.

DECOMPOSITION PRODUCTS: Thermal: carbon oxides, nitrogen oxides, sulfur oxides and formaldehyde. Hydrolysis: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is not compatible with oxidizers, strong acids and strong bases.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures and incompatible chemicals.

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

11. TOXICOLOGICAL INFORMATION

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

INHALATION: Inhalation of mists or sprays from this product can be mildly to moderately irritating to the respiratory system. Symptoms of exposure may include breathing difficulty, irritation of the mucus membranes, coughing, nasal congestion, and a sore throat. Inhalation of high concentrations or prolonged exposure by inhalation may cause depression of the central nervous system. Symptoms can include nausea, vomiting, dizziness, incoordination and drowsiness.

11. TOXICOLOGICAL INFORMATION (Continued)

INHALATION (continued): Prolonged inhalation may cause damage and reduced lung function.

CONTACT WITH SKIN or EYES: Direct contact with the eyes can cause moderate to severe irritation. Contact with vapors can cause redness and stinging. Skin contact may be irritating. Prolonged skin contact may cause blistering. Chronic, low-level exposure can cause dermatitis, dry, red and itchy or scaly skin. Chronic exposure to this product may cause adverse effects on the liver or kidneys.

INGESTION: Ingestion is not anticipated to be a likely route of occupational exposure to this product. If ingestion does occur, irritation of the mouth, throat, esophagus, and other tissues of the digestive system may occur. Symptoms of such over-exposure can include nausea, vomiting, diarrhea. Ingestion may also result in depression of the central nervous system, with symptoms as described under 'Inhalation'. Ingestion of large volumes of this product may be fatal. Ingestion may also lead to aspiration into the lungs. Aspiration of this product may cause a pneumonia-like reaction of lung tissue or pulmonary edema, which can cause a life-threatening accumulation of fluid in the lungs.

SKIN ABSORPTION: Several components of this product can be absorbed via intact skin. If large areas of the skin are involved, symptoms can include those described under 'Inhalation'.

INJECTION: Injection of this product (as may occur if skin is punctured by a contaminated object) can result in pain, redness, and local swelling.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. In the event of overexposure, the following symptoms may be observed:

ACUTE: This product can cause irritation by all routes of exposure. Eye contact may result in severe irritation. Prolonged skin contact may cause irritation or blistering. Ingestion may be harmful or fatal.

CHRONIC: Repeated skin contact can result in dermatitis (inflammation of the outer layer of the skin). Chronic inhalation of low concentrations of this product may result in reduced lung capacity, which could be permanent. Chronic exposure may result in damage to liver and kidneys.

TARGET ORGANS: ACUTE: Skin, eyes, respiratory system, central nervous system. Chronic: Skin, respiratory system, liver, kidneys.

TOXICITY DATA: The specific toxicology data available for components greater than 1% in concentration are as follows.

KAOLIN:



TCLo (Inhalation-Rat) 300 mg/m³/12 weeks-intermittent: Lungs, Thorax, or Respiration: other changes
 TCLo (Inhalation-Rat) 30 mg/m³/96 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), other changes, tumors
 TCLo (Inhalation-Rat) 9 mg/m³/96 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)
 TCLo (Inhalation-Rat) 30 mg/m³/72 weeks-intermittent: Lungs, Thorax, or Respiration: tumors
 TCLo (Inhalation-Rat) 30 mg/m³/48 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)
 TCLo (Inhalation-Rat) 30 mg/m³/96 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, tumors
 TCLo (Inhalation-Hamster) 30 mg/m³/72 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), other changes; Gastrointestinal: tumors
 TCLo (Inhalation-Hamster) 30 mg/m³/72 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), tumors
 TCLo (Inhalation-Hamster) 30 mg/m³/24 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, fibrosis (interstitial)
 TCLo (Inhalation-Hamster) 30 mg/m³/48 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), tumors
 TDLo (Oral-Rat) 370 gm/kg/37 days-intermittent: Blood: normocytic anemia, other changes, changes in erythrocyte (RBC) count
 TDLo (Oral-Rat) 590 gm/kg: female 37 day(s) pre-mating 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)
 TDLo (Oral-Rat) 370 gm/kg: female 37 day(s) pre-mating 1-22 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: other neonatal measures or effects

KEROSENE:

Standard Draize Test (Skin-Rabbit) 500 mg: Severe
 Standard Draize Test (Skin-Rabbit) 100%/24 hours: Moderate
 TCLo (Inhalation-Human) 0.15 mg/m³/5 years-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial)
 TCLo (Inhalation-Human) 250 mg/m³/4 years-intermittent: Behavioral: excitement, irritability
 TDLo (Oral-Human) 3570 mg/kg: Lungs, Thorax, or Respiration: cough; Gastrointestinal: nausea or vomiting; Nutritional and Gross Metabolic: body temperature increase
 TDLo (Oral-Human) 5.7 mg/kg: Lungs, Thorax, or Respiration: cough, other changes; Gastrointestinal: nausea or vomiting
 TDLo (Oral-Human) 5.7 mg/kg
 TDLo (Intravenous-Man) 403 mg/kg: Behavioral: somnolence (general depressed activity), hallucinations, distorted perceptions
 LDLo (Oral-Man) 500 mg/kg
 LDLo (Unreported-Man) 1176 mg/kg
 LD₅₀ (Oral-Rat) 15 gm/kg: Skin and Appendages: corrosive (after topical exposure)
 LD₅₀ (Oral-Rabbit) 2835 mg/kg: Behavioral: muscle weakness; Lungs, Thorax, or Respiration: respiratory stimulation; Endocrine: hypoglycemia
 LD₅₀ (Oral-Guinea Pig) 20 gm/kg: Behavioral: muscle weakness; Lungs, Thorax, or Respiration: respiratory stimulation; Endocrine: hypoglycemia
 LD₅₀ (Intraperitoneal-Rabbit) 6600 mg/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, emphysema, chronic pulmonary edema
 LD₅₀ (Intravenous-Rabbit) 180 mg/kg: Lungs, Thorax, or Respiration: respiratory stimulation; Behavioral: tremor, coma
 LD₅₀ (Intratracheal-Rabbit) 200 mg/kg

KEROSENE (continued):

LD₅₀ (Intratracheal-Rat) 800 mg/kg: Behavioral: convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: dyspnea, cyanosis
 LD (Oral-Rat) > 5 gm/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: hypermotility, diarrhea
 LD (Skin-Rabbit) > 2 gm/kg
 LC (Inhalation-Rat) > 5 gm/m³/4 hours: Behavioral: somnolence (general depressed activity)
 LDLo (Oral-Dog) 4 gm/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, acute pulmonary edema
 LDLo (Intraperitoneal-Rat) 10,700 mg/kg
 LDLo (Intravenous-Dog) 200 mg/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, acute pulmonary edema
 LDLo (Intratracheal-Dog) 800 mg/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, acute pulmonary edema
 LDLo (Unreported-Rat) 2 mg/kg: Gastrointestinal: peritonitis
 TDLo (Oral-Rat) 540 gm/kg/90 days-intermittent: Liver: changes in liver weight; Endocrine: changes in adrenal weight, anti-diuresis
 TDLo (Oral-Rat) 405 gm/kg/17 weeks-intermittent: Skin and Appendages: dermatitis, other (after systemic exposure); Skin and Appendages: hair
 TDLo (Oral-Mammal-Domestic) 10 mL/kg: Behavioral: muscle weakness; Gastrointestinal: decreased motility or constipation; Nutritional and Gross Metabolic: body temperature increase
 TDLo (Oral-Mammal-Domestic) 20 mL/kg: Cardiac: change in rate; Lungs, Thorax, or Respiration: cough
 TDLo (Subcutaneous-Rat) 5 mg/kg: Lungs, Thorax, or Respiration: acute pulmonary edema; Blood: hemorrhage

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD	(BLUE)	2	
FLAMMABILITY HAZARD	(RED)	2	
PHYSICAL HAZARD	(ORANGE)	0	
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Industrial Use and Handling Applications			

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

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

MORPHOLINE:

Open Irritation Test (Skin-Rabbit) 500 mg: Moderate
 Standard Draize Test (Eye-Rabbit) 2 mg: Severe
 LC₅₀ (Inhalation-Rat) 8000 ppm/8 hours
 LC₅₀ (Inhalation-Mouse) 1320 mg/m³/2 hours: Sense
 Organs and Special Senses (Eye): lachrymation;
 Behavioral: ataxia; Lungs, Thorax, or Respiration:
 cyanosis
 LC₅₀ (Inhalation-Mouse) 1.35 gm/m³
 LC₅₀ (Inhalation-Mammal-Species Unspecified) 12,000
 mg/m³
 LD₁₆ (Oral-Rat) 700 mg/kg: Reproductive: Paternal
 Effects: spermatogenesis (incl. genetic material,
 sperm morphology, motility, and count)
 LD₅₀ (Oral-Rat) 1738 mg/kg: Kidney/Ureter/Bladder:
 changes in blood vessels or in circulation of kidney
 LD₅₀ (Oral-Mouse) 525 mg/kg: Behavioral: sleep,
 somnolence (general depressed activity)
 LD₅₀ (Oral-Mouse) 1200 mg/kg
 LD₅₀ (Oral-Mammal-Species Unspecified) 1220 mg/kg
 LD₅₀ (Skin-Rabbit) 500 µL/kg
 LD₅₀ (Intraperitoneal-Mouse) 413 mg/kg:
 Reproductive: Paternal Effects: testes, epididymis,
 sperm duct
 LD₅₀ (Subcutaneous-Mouse) 458 mg/kg
 LC (Inhalation-Mouse) 0.45 gm/m³/2 hours:
 Behavioral: irritability; Lungs, Thorax, or Respiration:
 dyspnea; Gastrointestinal: nausea or vomiting
 LC (Inhalation-Mouse) 1.67 gm/m³/2 hours: Blood:
 hemorrhage; Nutritional and Gross Metabolic:
 weight loss or decreased weight gain
 LC (Inhalation-Mouse) 1.98 gm/m³/2 hours
 LD (Oral-Rat) 1500 mg/kg
 LD (Oral-Rat) 2300 mg/kg: Brain and Coverings:
 changes in circulation (hemorrhage, thrombosis,
 etc.); Cardiac: cardiomyopathy including infarction,
 other changes
 LDLo (Oral-Mouse) 1200 mg/kg
 LDLo (Oral-Guinea Pig) 100 mg/kg: Sense Organs
 and Special Senses (Olfaction): effect, not
 otherwise specified; Gastrointestinal: ulceration or
 bleeding from stomach, ulceration or bleeding from
 small intestine
 LC₅₀ (Inhalation-Mouse) 1.35 gm/m³
 LC₅₀ (Inhalation-Mammal-Species Unspecified) 12,000
 mg/m³
 LD₁₆ (Oral-Rat) 700 mg/kg: Reproductive: Paternal
 Effects: spermatogenesis (incl. genetic material,
 sperm morphology, motility, and count)
 LD₅₀ (Oral-Rat) 1738 mg/kg: Kidney/Ureter/Bladder:
 changes in blood vessels or in circulation of kidney
 LD₅₀ (Oral-Mouse) 525 mg/kg: Behavioral: sleep,
 somnolence (general depressed activity)
 LD₅₀ (Oral-Mouse) 1200 mg/kg
 LD₅₀ (Oral-Mammal-Species Unspecified) 1220 mg/kg
 LD₅₀ (Skin-Rabbit) 500 µL/kg
 LD₅₀ (Intraperitoneal-Mouse) 413 mg/kg:
 Reproductive: Paternal Effects: testes, epididymis,
 sperm duct
 LD₅₀ (Subcutaneous-Mouse) 458 mg/kg
 LC (Inhalation-Mouse) 0.45 gm/m³/2 hours:
 Behavioral: irritability; Lungs, Thorax, or Respiration:
 dyspnea; Gastrointestinal: nausea or vomiting
 LC (Inhalation-Mouse) 1.67 gm/m³/2 hours: Blood:
 hemorrhage; Nutritional and Gross Metabolic:
 weight loss or decreased weight gain
 LC (Inhalation-Mouse) 1.98 gm/m³/2 hours
 LD (Oral-Rat) 1500 mg/kg
 LD (Oral-Rat) 2300 mg/kg: Brain and Coverings:
 changes in circulation (hemorrhage, thrombosis,
 etc.); Cardiac: cardiomyopathy including infarction,
 other changes
 LDLo (Oral-Mouse) 1200 mg/kg
 LDLo (Oral-Guinea Pig) 100 mg/kg: Sense Organs
 and Special Senses (Olfaction): effect, not
 otherwise specified; Gastrointestinal: ulceration or
 bleeding from stomach, ulceration or bleeding from
 small intestine
 LDLo (Unreported-Rat) 1600 mg/kg
 TDLo (Oral-Rat) 500 mg/kg

MORPHOLINE (continued):

TDLo (Oral-Mouse) 2560 mg/kg/1 year-continuous:
 Tumorigenic: neoplastic by RTECS criteria; Lungs,
 Thorax, or Respiration: bronchiogenic carcinoma;
 Liver: tumors
 TDLo (Oral-Guinea Pig) 13,500 mg/kg/30 days-
 intermittent: Gastrointestinal: necrotic changes;
 Kidney/Ureter/Bladder: changes in tubules
 (including acute renal failure, acute tubular
 necrosis); Related to Chronic Data: death
 TDLo (Skin-Mouse) 100 pph/15 minutes: Skin and
 Appendages: corrosive (after topical exposure)
 TDLo (Skin-Rabbit) 9 gm/kg/10 days-intermittent:
 Liver: fatty liver degeneration; Skin and
 Appendages: primary irritation (after topical
 exposure); Related to Chronic Data: death
 TDLo (Skin-Guinea Pig) 27 gm/kg/30 days-
 intermittent: Kidney/Ureter/Bladder: changes in both
 tubules and glomeruli; Skin and Appendages:
 primary irritation (after topical exposure); Related to
 Chronic Data: death
 TDLo (Ocular-Rabbit) 100 pph: Sense Organs and
 Special Senses (Eye): conjunctive irritation, corneal
 damage, effect, not otherwise specified
 TCLo (Inhalation-Rat) 70 mg/m³/4 hours/17 weeks-
 intermittent: Vascular: BP lowering not
 characterized in autonomic section; Blood: changes
 in leukocyte (WBC) count
 TCLo (Inhalation-Rat) 250 ppm/6 hours/13 weeks-
 intermittent: Lungs, Thorax, or Respiration: fibrosis,
 focal (pneumoconiosis)
 TCLo (Inhalation-Rat) 0.07 gm/m³/2 weeks-
 intermittent: Peripheral Nerve and Sensation:
 recording from peripheral motor nerve; Vascular: BP
 elevation not characterized in autonomic section;
 Blood: other changes
 TCLo (Inhalation-Rat) 0.07 gm/m³/30 days-
 intermittent: Blood: changes in other cell count
 (unspecified)
 TCLo (Inhalation-Rat) 0.008 gm/m³/61 days-
 intermittent: Vascular: BP lowering not
 characterized in autonomic section; Blood: changes
 in other cell count (unspecified)
 TCLo (Inhalation-Rat) 0.07 gm/m³/122 days-
 intermittent: Liver: other changes; Blood:
 changes in leukocyte (WBC) count
 TCLo (Inhalation-Rat) 0.008 gm/m³/122 days-
 intermittent: Blood: changes in spleen;
 Immunological Including Allergic: decrease in
 cellular immune response
 TCLo (Inhalation-Mouse) 0.1 gm/m³/2 hours: Lungs,
 Thorax, or Respiration: other changes
 TCLo (Inhalation-Guinea Pig) 70 mg/m³/4 hours/17
 weeks-intermittent: Liver: liver function tests
 impaired; Kidney/Ureter/Bladder: other changes in
 urine composition
 TCLo (Inhalation-Guinea Pig) 0.07 gm/m³/2 weeks-
 intermittent: Peripheral Nerve and Sensation:
 recording from peripheral motor nerve
 TCLo (Inhalation-Guinea Pig) 0.07 gm/m³/30 days-
 intermittent: Blood: other changes, changes in
 leukocyte (WBC) count
 TCLo (Inhalation-Guinea Pig) 0.008 gm/m³/61 days-
 intermittent: Liver: liver function tests impaired;
 Kidney/Ureter/Bladder: other changes in urine
 composition
 Morphological Transformation (Mouse-Fibroblast) 125
 mg/L
 Morphological Transformation (Mouse-Lymphocyte) 1
 µL/L
 Mutation in Mammalian Somatic Cells (Mouse-
 Lymphocyte) 1 gm/L
 Sister Chromatid Exchange (Hamster-Ovary) 160
 mg/L
 Cytogenetic Analysis (Inhalation-Rat) 0.07 mg/L/122
 days-intermittent
 LDLo (Unreported-Rat) 1600 mg/kg
 TDLo (Oral-Rat) 500 mg/kg
 TDLo (Oral-Rat) 24 gm/kg/30 days-intermittent:
 Gastrointestinal: necrotic changes;
 Kidney/Ureter/Bladder: changes in tubules
 (including acute renal failure, acute tubular
 necrosis); Related to Chronic Data: death

MORPHOLINE (continued):

TDLo (Oral-Mouse) 2560 mg/kg/1 year-continuous:
 Tumorigenic: neoplastic by RTECS criteria; Lungs,
 Thorax, or Respiration: bronchiogenic carcinoma;
 Liver: tumors
 TDLo (Oral-Guinea Pig) 13,500 mg/kg/30 days-
 intermittent: Gastrointestinal: necrotic changes;
 Kidney/Ureter/Bladder: changes in tubules
 (including acute renal failure, acute tubular
 necrosis); Related to Chronic Data: death
 TDLo (Skin-Mouse) 100 pph/15 minutes: Skin and
 Appendages: corrosive (after topical exposure)
 TDLo (Skin-Rabbit) 9 gm/kg/10 days-intermittent:
 Liver: fatty liver degeneration; Skin and
 Appendages: primary irritation (after topical
 exposure); Related to Chronic Data: death
 TDLo (Skin-Guinea Pig) 27 gm/kg/30 days-
 intermittent: Kidney/Ureter/Bladder: changes in both
 tubules and glomeruli; Skin and Appendages:
 primary irritation (after topical exposure); Related to
 Chronic Data: death
 TDLo (Ocular-Rabbit) 100 pph: Sense Organs and
 Special Senses (Eye): conjunctive irritation, corneal
 damage, effect, not otherwise specified
 TCLo (Inhalation-Rat) 70 mg/m³/4 hours/17 weeks-
 intermittent: Vascular: BP lowering not
 characterized in autonomic section; Blood: changes
 in leukocyte (WBC) count
 TCLo (Inhalation-Rat) 250 ppm/6 hours/13 weeks-
 intermittent: Lungs, Thorax, or Respiration: fibrosis,
 focal (pneumoconiosis)
 TCLo (Inhalation-Rat) 0.07 gm/m³/2 weeks-
 intermittent: Peripheral Nerve and Sensation:
 recording from peripheral motor nerve; Vascular: BP
 elevation not characterized in autonomic section;
 Blood: other changes
 TCLo (Inhalation-Rat) 0.07 gm/m³/30 days-
 intermittent: Blood: changes in other cell count
 (unspecified)
 TCLo (Inhalation-Rat) 0.008 gm/m³/61 days-
 intermittent: Vascular: BP lowering not
 characterized in autonomic section; Blood: changes
 in other cell count (unspecified)
 TCLo (Inhalation-Rat) 0.07 gm/m³/122 days-
 intermittent: Liver: other changes; Blood:
 changes in leukocyte (WBC) count
 TCLo (Inhalation-Rat) 0.008 gm/m³/122 days-
 intermittent: Blood: changes in spleen;
 Immunological Including Allergic: decrease in
 cellular immune response
 TCLo (Inhalation-Mouse) 0.1 gm/m³/2 hours: Lungs,
 Thorax, or Respiration: other changes
 TCLo (Inhalation-Guinea Pig) 70 mg/m³/4 hours/17
 weeks-intermittent: Liver: liver function tests
 impaired; Kidney/Ureter/Bladder: other changes in
 urine composition
 TCLo (Inhalation-Guinea Pig) 0.07 gm/m³/2 weeks-
 intermittent: Peripheral Nerve and Sensation:
 recording from peripheral motor nerve
 TCLo (Inhalation-Guinea Pig) 0.07 gm/m³/30 days-
 intermittent: Blood: other changes, changes in
 leukocyte (WBC) count
 TCLo (Inhalation-Guinea Pig) 0.008 gm/m³/61 days-
 intermittent: Liver: liver function tests impaired;
 Kidney/Ureter/Bladder: other changes in urine
 composition
 Morphological Transformation (Mouse-Fibroblast) 125
 mg/L
 Morphological Transformation (Mouse-Lymphocyte) 1
 µL/L
 Mutation in Mammalian Somatic Cells (Mouse-
 Lymphocyte) 1 gm/L
 Sister Chromatid Exchange (Hamster-Ovary) 160
 mg/L
 Cytogenetic Analysis (Inhalation-Rat) 0.07 mg/L/122
 days-intermittent
POLYDIMETHYL SILOXANE:
 Standard Draize Test (Skin-Rabbit) 500 µL/24 hours:
 Mild
 Standard Draize Test (Eye-Rabbit) 100 µL/24 hours:
 Mild
 LD (Oral-Rat) > 5 gm/kg
 LD (Intramuscular-Rat) > 1200 µL/kg: Immunological
 Including Allergic: increase in humoral immune
 response

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

POLYDIMETHYL SILOXANE (continued):

LD (Skin-Rabbit) > 10,200 mg/kg
LDLo (Intraperitoneal-Rat) 16 mL/kg: Gastrointestinal: hypermotility, diarrhea; Immunological Including Allergic: decrease in cellular immune response, decrease in humoral immune response
TDLo (Oral-Rat) 1800 mL/kg/26 weeks-continuous: Lungs, Thorax, or Respiration: changes in lung weight; Liver: changes in liver weight; Kidney/Ureter/Bladder: other changes in urine composition
TDLo (Oral-Rat) 227 gm/kg: Sense Organs and Special Senses (Eye): corneal damage; Behavioral: food intake (animal); Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)

POLYDIMETHYL SILOXANE (continued):

TDLo (Subcutaneous-Rat) 10 gm/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system
TDLo (Subcutaneous-Rat) 8 gm/kg: female 15-22 day(s) after conception: Reproductive: Effects on Newborn: stillbirth
TDLo (Subcutaneous-Rabbit) 260 mg/kg: female 6-18 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetal death; Specific Developmental Abnormalities: body wall
TALL OIL FATTY ACIDS:
Standard Draize Test (Eye-Rabbit) 100 µL/24 hours: Moderate

TALL OIL FATTY ACIDS (continued):

LD₅₀ (Oral-Rat) > 17 gm/kg: Kidney/Ureter/Bladder: other changes; Nutritional and Gross Metabolic: other changes
LD₅₀ (Skin-Rabbit) > 2 gm/kg: Behavioral: food intake (animal); Gastrointestinal: hypermotility, diarrhea; Skin and Appendages: dermatitis, other (after systemic exposure)
TDLo (Oral-Rat) 420 gm/kg: Gastrointestinal: hypermotility, diarrhea, other changes
TDLo (Oral-Rat) 72,800 mg/kg/104 weeks-continuous: Sense Organs and Special Senses (Eye): conjunctive irritation
TDLo (Oral-Rat) 72,800 mg/kg/104 weeks-continuous: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

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

HYDROTREATED LIGHT PETROLEUM DISTILLATE: IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

KAOLIN: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

KEROSENE: IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

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

The remaining components of this product are not found on the following lists: 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 can be mildly to moderately irritating by all routes of exposure, depending on concentration and duration of exposure.

SENSITIZATION TO THE PRODUCT: No component of this product is a known human skin and respiratory sensitizers.

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

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

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

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

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

*A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process.*

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

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil. The following information is available for the Kerosene component.

KEROSENE:

Kerosene is a mixture of petroleum hydrocarbons, chiefly C10-C16 alkanes, and a typical analysis includes the identification of n-dodecane, alkyl benzene derivatives, naphthalene, and tetrahydronaphthalenes. Log octanol/water partition coefficients for these representative classes of compounds range from approximately 3.3 to 5.25. Based on these values, soil adsorption coefficients ranging from 1486 to 17,100 can be obtained using regression-derived equations. The magnitude of these values indicates that some components of Kerosene will display low mobility and some will be essentially immobile in soil. The calculated downward movement of Kerosene through 5 different soil types, representing that which may be observed after a large spill, ranged from 24.5-102 cm after 12 hours.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence and biodegradability. The following information is available for the Kerosene component.

KEROSENE:

If released to soil, Kerosene is expected to biodegrade under both aerobic and anaerobic conditions. Some components of Kerosene may adsorb very strongly to soil. Kerosene may rapidly volatilize from both moist and dry soil although its expected strong adsorption may significantly attenuate the rate of this process. If released to water, Kerosene is expected to biodegrade under both aerobic and anaerobic conditions. Some components of Kerosene may significantly bioconcentrate in fish and aquatic organisms and strongly adsorb to sediment and suspended organic matter. The estimated half-life for volatilization of Kerosene from a model river is 3-6 hrs while that from a model lake is > 130 days; the former model does not account for the attenuating effect of adsorption. If released to the atmosphere, Kerosene may undergo oxidation by a gas-phase reaction with photochemically produced hydroxyl radicals with an estimated half-life of 2-3.4 days.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The following information is available for the Kerosene component.

KEROSENE:

The concentration of Kerosene-range hydrocarbons in fish skeletal muscle homogenates approx 6 months after a spill into a Pennsylvania stream were brook trout-1.45 to 4.60 ppm, rainbow and brown trout-2.6 to 14.2 ppm, white suckers-2.55 to 8.73 ppm and sculpins-0.57 ppm while control samples were brook trout-0.30 ppm, bluegill sunfish-0.20 ppm, and large mouth bass 0.20 ppm. Kerosene is a mixture of petroleum hydrocarbons, chiefly C10-C16 alkanes, and a typical analysis includes the identification of n-dodecane, alkyl benzene derivatives, naphthalene, and tetrahydronaphthalenes. Log octanol/water partition coefficients for these representative classes of compounds range from approximately 3.3 to 5.25. Based on these values, bioconcentration factors ranging from 190 to 5800 can be obtained using regression-derived equations(5). The magnitude of these values indicates that some components of Kerosene may significantly bioconcentrate in fish and aquatic organisms

12. ECOLOGICAL INFORMATION (Continued)

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric and aquatic environments should be avoided. The following aquatic toxicity data are available for the components of this product:

KAOLIN:

LC₅₀ (Water flea *Daphnia pulex*) 24-48 hours = >1.1 g/liter. /Conditions of bioassay not specified in source examined

LD₅₀ (Honeybee) acute dietary >1000 ppm ai

No effect on the hatching success or egg development rate of four marine fish species: red seabream (*Pagrus major*), black porgy (*Acanthopagrus schlegelii*), striped knifefish (*Oplegnathus fasciatus*), and threeline grunt (*Parapristipoma trilineatum*), was observed at kaolinite concentrations up to 10 g/liter for 24 hours. Larvae were more sensitive to kaolinite: the 12-hour LC₅₀ values were 170 and 710 mg/liter for *P. trilineatum* and *O. fasciatus*, respectively; mortality was also observed for *P. major* at concentrations of 1000 mg/liter and above

Georgia kaolin caused < 10% mortality of sea urchin (*Strongylocentrosus purpuratus*), Japanese clam (*Tapes japonica*), hermit crab (*Pagurus hirsutiusculus*), isopod (*Sphaeroma pentodon*), mud snail (*Nassarius obsoletus*), blue mussel (*Mytilus edulis*), and tunicates (*Molgula manhattensis* and *Styela montereyensis*) within 5-12 days

KEROSENE:

TLm (Bluegill) 24 hours = 2990 ppm/fresh water

MORPHOLINE:

LC₅₀ (bluegill) 96 hours = 350 mg/L

LC₅₀ (daphnia) 24 hours = 100 mg/L

TLm Aquatic Toxicity Rating 96 hours = 100-1000 ppm

EC₅₀ (*Daphnia magna*) 24 hours = 119 mg/L (immobilization)

OTHER ADVERSE EFFECTS: The 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.

13. DISPOSAL CONSIDERATIONS

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

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

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards

EPA WASTE NUMBER: Wastes of this product should be tested for D001 (Characteristic/Flammability).

14. TRANSPORTATION INFORMATION

NOTE: Due to the flash point, this material is only regulated as a hazardous material by the U.S. D.O.T. It is not classified as dangerous goods under any other jurisdiction or transportation agency.

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS: This product is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101. The following classification is for ground shipments only. Air shipments are not regulated.

PROPER SHIPPING NAME: Combustible liquid, n.o.s. (kerosene)

HAZARD CLASS NUMBER and DESCRIPTION: Combustible liquid

UN IDENTIFICATION NUMBER: NA 1993

PACKING GROUP: III

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2008: 128

MARINE POLLUTANT: No component of this product meets the criteria of a Marine Pollutant, per Appendix B to 49 CFR 172.101.

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) DESIGNATION: This product is NOT classified as dangerous goods by the International Air Transport Association.

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is NOT classified as dangerous goods by the International Maritime Organization.

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.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no 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. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

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.

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

LABELING (Precautionary Statements) ANSI LABELING (Z129.1): **WARNING!** COMBUSTIBLE LIQUID. VAPOR MAY FORM EXPLOSIVE MIXTURES WITH AIR. VAPORS MAY TRAVEL LONG DISTANCES TO IGNITION SOURCE AND FLASH BACK. CAN CAUSE IRRITATION BY ALL ROUTES OF EXPOSURE. INHALATION AND INGESTION MAY CAUSE ADVERSE CENTRAL NERVOUS SYSTEM EFFECTS. HARMFUL OR FATAL IF SWALLOWED. Avoid contact with skin or eyes. Avoid breathing mists, sprays or fumes. Do not taste or swallow. Wash thoroughly after handling. Wear gloves and goggles. Wear appropriate body protection and face-shield if operations will involve splashes or sprays. **FIRST-AID:** In case of contact with skin or eyes, flush immediately with plenty of water for at least 15 minutes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Sweep or vacuum spilled material, avoiding contact with water. Consult Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are listed on the DSL Inventory.

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

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: **Class B6:** Combustible Liquid. **Class D2B:** Poisonous and infectious material; irritation.



16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 1961, Hilo, HI 96721
(808) 969-4846 • (800) 441-3365

DATE OF PRINTING:

April 16, 2010

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. Star Brite 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, Star brite 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.

DFG MAK Germ Cell Mutagen Categories: **1:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals.

3A: Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*, in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known *in vivo* mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can cause 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, **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend.

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.

EXPOSURE LIMITS IN AIR (continued):

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 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);

DEFINITIONS OF TERMS (Continue)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

HEALTH HAZARD (continued): **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. *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).

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 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 are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases:* Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group II *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.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): **2 (continued):** *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:* Packaging Group I *Solids:* any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. *Liquids:* Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%) /cellulose mixture. *Unstable Reactives:* Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity:* Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides:* Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives:* Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases:* No Rating. *Pyrophorics:* Add to the definition of Flammability "4". *Oxidizers:* No "4" rating. *Unstable Reactives:* Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: **0** (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials); Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according 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:

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 1 (continued): 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 IIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the UN *Recommendation on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature**: The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **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:

This section explains the impact of various laws and regulations on the material. **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **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/NDSL**); 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.