

MATERIAL SAFETY DATA SHEET

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

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): STARBRITE WATERPROOFING WITH PTEF®
CHEMICAL NAME/CLASS: Stoddard Solvent Mixture
PRODUCT USE: Fabric Treatment
PRODUCT NUMBER: 81922, 81900N
MANUFACTURER'S NAME: STAR BRITE
U.S. ADDRESS: 4041 S.W. 47 Avenue
Ft. Lauderdale, FL 33314
U.S. EMERGENCY PHONE: Chemtrec
(800) 424-9300 or (703) 527-3887
U.S. INFORMATION PHONE: (954) 587-6280
INTERNATIONAL ADDRESS:
INTERNATIONAL EMERGENCY PHONE: 703-527-3887
INTERNATIONAL BUSINESS PHONE: 954-587-6280
DATE: September 20, 2009dco Replaces: July 25, 2006

2. COMPOSITION and INFORMATION ON INGREDIENTS

EU LABELING AND CLASSIFICATION: This product meets the definition of the hazard class of Toxic, as defined by the European Economic Community Guidelines.

EU CLASSIFICATION: [T] Toxic; Carcinogenic Category 2; F [Flammable]

EU RISK PHRASES: [R: 10]: Flammable. [R: 45]: May cause cancer. [R: 65]: Harmful, may cause lung damage if swallowed.

EU SAFETY PHRASES: [S: 2-]: Keep out of the reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only*). [S: 23]: Do not breathe fumes, vapors or spray. [S: 24]: Avoid contact with skin. [S: 38]: In case of insufficient ventilation, wear suitable respiratory equipment. [S: 36/37]: Wear suitable protective clothing and gloves. [S: 62]: If swallowed, do not induce vomiting. Seek medical advice immediately and show this container or label.

CHEMICAL NAME	CAS #	EINECS #	% w/v	EU CLASSIFICATION FOR COMPONENTS
Tetraisopropyl Titanate	546-68-9	208-909-6	0.3-1.0%	HAZARD CLASSIFICATION: Not applicable. RISK PHRASES: Not applicable.
Trimethylated Silica	68988-89-6	Unlisted	0.3-1.0%	HAZARD CLASSIFICATION: Not applicable. RISK PHRASES: Not applicable.
Xylene (mixed isomers)	1330-20-7	215-535-7	0.3-1.0%	HAZARD CLASSIFICATION: Xn [Harmful], F [Flammable] RISK PHRASES: Not applicable.
Stoddard Solvent	8052-41-3	232-489-3	99.0-100%	HAZARD CLASSIFICATION: T [Toxic], Carcinogenic Category 2 RISK PHRASES: R: 45, R: 65

See Section 15 for full EU classification information of product and components.

NOTE: ALL Canadian WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. The MSDS is also prepared to include all European Union required information under EU Directives.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear, light-yellow liquid with a kerosene/petroleum odor. **Health Hazards:** Inhalation overexposures to mists or sprays of this product can cause central nervous system effects. Severe inhalation exposures may be fatal. Eye contact may be irritating. Contact with the skin may be irritating, especially if prolonged. **Flammability Hazards:** This product is flammable; vapors and liquid may ignite if exposed to an ignition source or if heated to its flash point of 37.7-39°C (100-102°F). If involved in a fire, this product will produce irritating and toxic materials such as various carbon oxides, hydrocarbons and aldehydes. Vapors of this product are heavier than air and can spread a long distance to an ignition source and flashback. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** This material may be harmful or fatal to contaminated plant, animal, and aquatic life. **Emergency Recommendations:** Although the odor threshold of Stoddard Solvent is below the TLV, it may not be a good warning property as olfactory fatigue can occur. Emergency responders must wear the personal protective equipment suitable for the situation to which they are responding.

3. HAZARD IDENTIFICATION (Continued)

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 described on the following page.

INHALATION: If this product inhaled, fume, mists or sprays can mildly irritate the respiratory system and cause coughing, sneezing, and difficulty breathing. Depending on the concentration and duration of exposure, inhalation overexposure can cause central nervous system depression, including dizziness, headache, nausea, fatigue, vomiting and incoordination. Severe inhalation overexposure (as may occur in a confined space with inadequate ventilation) may cause unconsciousness and death. Chronic exposure may cause liver and kidney damage.

CONTACT WITH SKIN or EYES: Skin contact can cause mild to moderate irritation, depending on the duration and concentration of exposure. Symptoms of such overexposure may cause redness and irritation. Prolonged or repeated skin contact with this product may cause dermatitis (dry, red, scaly skin) from defatting of the skin. Case reports indicate that when Stoddard solvent is allowed to remain in close contact with skin, as when clothing wet with Stoddard solvent is worn, blisters and sores may develop. Eye contact with this product may cause irritation, redness, and watering.

SKIN ABSORPTION: The components of this product are not known to be absorbed through intact skin.

INGESTION: Ingestion is not anticipated to be a significant route of exposure for any component of this product. If this product is swallowed, it may cause nausea, vomiting, and diarrhea. A significant hazard associated with ingestion of this product is aspiration; breathing this material into the lungs can cause severe lung irritation and tissue damage, which can cause chemical pneumonia or pulmonary edema (life-threatening lung conditions).



INJECTION: Injection of this product (as may occur if skin is punctured by a contaminated object) can cause 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: Inhalation of fumes, mists or sprays can cause adverse effects on the central nervous system. Severe inhalation overexposure may cause unconsciousness and death. A significant hazard associated with ingestion of this product is aspiration; breathing this material into the lungs can cause severe lung irritation and tissue damage, which can cause chemical pneumonia or pulmonary edema (life-threatening lung conditions).

CHRONIC: Repeated skin contact with this product may cause dermatitis (dry, red, scaly skin). Chronic exposure may cause liver and kidney damage. See Section 11 (Toxicology Information) for additional data.

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

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

See Section 16 for Definition of Ratings

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. 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 and soap. Minimum flushing is for 15 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's liquid or vapors enter the eyes, open the contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. Minimum flushing is for 15 minutes.

INHALATION: If vapors, mists, or sprays of this product are inhaled, remove the contaminated individual to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers. The contaminated individual should seek immediate medical attention.

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 or drink several cupfuls of 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 respiratory problems, dermatitis, other skin disorders, and central nervous disorders may be aggravated by exposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure. Provide oxygen, if necessary. Pulmonary function tests, chest X-rays, and nervous system evaluations may prove useful.

5. FIRE-FIGHTING MEASURES

The following values are for the main component, Stoddard Solvent.

FLASH POINT (closed cup): 37.7-39°C (100-102°F)

AUTOIGNITION TEMPERATURE: 229-232°C (444-450°F)

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 0.9%

Upper (UEL): 6.0%

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES

Foam: YES

Halon: YES

Carbon Dioxide: YES

Dry Chemical: YES

Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is flammable; vapors and liquid may ignite if exposed to an ignition source or if heated to its flash point of 37.7-39°C (100-102°F). Vapors of this product are heavier than air and can spread a long distance to an ignition source and flashback. This product can float on water and may travel to distant locations and spread fire. If involved in a fire, this product will produce irritating and toxic materials such as various carbon oxides, aldehydes and hydrocarbons. Containers may rupture violently when exposed to fire or excessive heat for sufficient time.

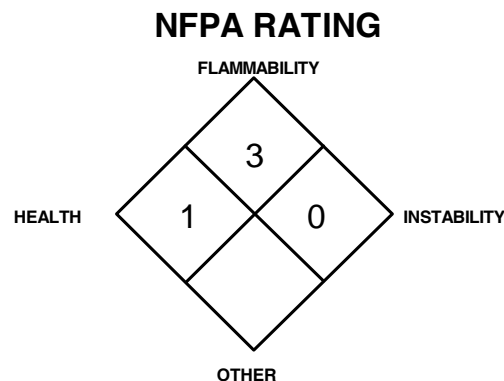
Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: In general, materials similar to this product have low electrical conductivities and therefore the liquid can accumulate static charge by flow, agitation or pouring. The warmed vapour can be ignited by an electrostatic discharge of sufficient energy.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if it can be done without risk to personnel. Water spray can be used to cool fire-exposed containers. Avoid getting water into containers because of the danger of boiling over. Stop leak before attempting to stop the fire. If the leak cannot be stopped, and if there is no risk to the surrounding area, let the fire burn itself out. Water fog or spray can also be used by trained firefighters to disperse this product's 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.

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: In case of a release, clear the affected area and protect people. Spills will be slippery. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. Appropriately trained personnel in proper personal protective equipment, using pre-planned procedures should respond to uncontrolled releases. The proper personal protective equipment for incidental releases (e.g., 32-ounce container) should be rubber gloves and goggles. In the event that cleanup will generate excessive splashes, a face-shield, boots, and chemical resistant body protection should also be worn. In the event of a non-incidental release (e.g., several 1-gallon containers released in a poorly ventilated area), minimum Personal Protective Equipment should be Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus. A fire-retardant suit must be worn over the chemical resistant suit. Short-term colorimetric detector tubes for the determination of hydrocarbons and petroleum hydrocarbons are commercially available. Monitor area for combustible vapor levels. Monitoring must indicate less than 10% LEL (refer to Section 5, Fire-fighting Measures) before emergency response personnel are permitted in the area. Monitoring must indicate that oxygen levels are above 19.5% before anyone is permitted in the area without Self-Contained Breathing Apparatus. Absorb spilled liquid with activated carbon, polypads, or other suitable absorbent materials. Decontaminate the area thoroughly. Place all spill residue in an appropriate container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate standards of Canada or EU Member States (see Section 13, Disposal Considerations).



**See Section 16 for
Definition of Ratings**

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 vapors, mists, or sprays of this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Keep away from heat, sparks, and other sources of ignition. Keep container tightly closed when not in use. Open containers slowly on a stable surface. Use non-sparking tools. Bond and ground containers during transfers of material. If this product is transferred into another container, only use portable containers and dispensing equipment (faucet, pump, drip can) approved for flammable liquids. 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 away from incompatible materials (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 (e.g., sprinkler system, portable fire extinguishers). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Refer to NFPA 30, *Flammable and Combustible Liquids Code*, for additional information on storage. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care. Never perform any welding, cutting, soldering, drilling, or other hot work on an empty container or piping until all liquid, vapors, and residue have been cleared.

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 U.S. Federal, State, or local procedures and appropriate Canadian standards, or those of EU Member States.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below, if applicable. Use a non-sparking, grounded, explosion-proof ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside, taking necessary precautions for environmental protection. 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	AIHA WEELs		OTHER
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	TWA ppm	STEL ppm	mg/m ³
Stoddard Solvent	8052-41-3	100	NE	500 100 (vacated 1989 PEL)	NE	350 mg/m ³	1800 (ceiling) 15 min.	20,000 mg/m ³	NE	NE	NE
Tetraisopropyl Titanate	546-68-9	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Trimethylated Silica	68988-89-6	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Xylene (mixed isomers)	1330-20-7	100	150	100	150 (vacated 1989 PEL)	100	150	900	NE	NE	DFG MAKs: TWA = 100 (skin) PEAK = 2•MAK 15 min. average value, 1-hr interval DFG MAK Pregnancy Risk Classification: D Carcinogen: EPA-D, EA-I, IARC-3, TLV-A4

NE = Not Established.

P = Avoid prolonged and repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.

See Section 16 for Definitions of Terms Used.

EYE PROTECTION: Splash goggles or safety glasses. Face-shields should be worn if operations will generate splashes or sprays. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, or the European Standard EN166.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed above, if applicable. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, the Canadian CSA Standard Z94.4-93, the European Standard EN149, or Standards of EU member states. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following are NIOSH respiratory protective equipment for Stoddard Solvent, the main component.

STODDARD SOLVENT

CONCENTRATION RESPIRATORY PROTECTION

Up to 3500 mg/m³: Any Chemical Cartridge Respirator with organic vapor cartridge(s), or any Supplied-Air Respirator (SAR).

Up to 8750 mg/m³: Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s).

Up to 17,500 mg/m³: 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 (SCBA) with a full facepiece, or any SAR with a full facepiece.

Up to 20,000 mg/m³: Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

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.

HAND PROTECTION: Wear Nitrile rubber, Polyethylene, Viton™ gloves (resistance to breakthrough longer than 8 hours when tested against a similar petroleum substance) 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. If necessary, refer to U.S. OSHA 29 CFR 1910.138, appropriate Standards of Canada, or appropriate Standards of the European Union.

BODY PROTECTION: If operations will generate splashes or sprays, use body protection appropriate for task (e.g., coveralls or apron). If necessary, refer to appropriate Standards of Canada or the European Union. 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.

9. PHYSICAL and CHEMICAL PROPERTIES

The following values are for the main component, Stoddard Solvent.

SPECIFIC VAPOR DENSITY (air = 1): Not available.

EVAPORATION RATE (n-BuAc = 1): 0.1

SPECIFIC GRAVITY @ 20°C (water = 1): 0.78

MELTING/FREEZING POINT: -70°C (-94°F)

SOLUBILITY IN WATER: Insoluble.

BOILING POINT: 149-204.5°C (300-400°F)

VAPOR PRESSURE, mm Hg @ 25°C: 0.53 kPa (4-4.5 mmHg) pH: Not applicable.

ODOR THRESHOLD (Stoddard Solvent): < 1 ppm (5 mg/m³) VAPOR DENSITY (air = 1): 5

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

The following information is for the product.

VOLATILE ORGANIC COMPOUNDS (VOC): 94.25% by weight VISCOSITY @ 20°C: 75 (est.)

APPEARANCE, ODOR AND COLOR: This product is a light-yellow, colorless liquid with a kerosene/petroleum odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): Although the odor threshold of Stoddard Solvent is below the TLV, it may not be a good warning property as olfactory fatigue can occur.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product can produce various hydrocarbons, carbon oxides and aldehydes.

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

HAZARDOUS POLYMERIZATION: Will not occur.

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

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Currently, the following toxicological data are available for components

STODDARD SOLVENT:

Standard Draize Test (Eye-Rabbit) 00 mg/24 hours: Moderate

LD (Oral-Rat) > 5 gm/kg: Behavioral: somnolence (general depressed activity)

LD (Skin-Rabbit) > 3 gm/kg

LC (Inhalation-Rat) > 5500 mg/m³/4 hours: Behavioral: somnolence (general depressed activity)

LC (Inhalation-Dog) > 8 gm/m³/8 hours-continuous: Behavioral: tremor, convulsions or effect on seizure threshold

LCLo (Inhalation-Cat) 1700 ppm/7 hours: Behavioral: tremor, convulsions or effect on seizure threshold

LCLo (Inhalation-Rat) 8200 mg/m³/8 hours: Behavioral: tremor

LCLo (Inhalation-Dog) 8000 mg/m³/3 hours: Behavioral: alteration of classical conditioning

TCLo (Inhalation-Rat) 330 ppm/65 days-intermittent: Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Blood: other changes

TCLo (Inhalation-Rat) 480 mg/m³/65 days-intermittent: Blood: normocytic anemia

TCLo (Inhalation-Rat) 1100 mg/m³/65 days-intermittent: Kidney, Ureter, Bladder: renal function tests depressed; Blood: normocytic anemia

TDLo (Skin-Rabbit) 2 gm/kg/4 weeks-intermittent: Skin and Appendages: dermatitis, other (after systemic exposure)

TETRAISOPROPYL TITINATE:

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

Standard Draize Test (Eye-Rabbit) 20 mg/24 hours: Moderate

LD₅₀ (Oral-Rat) 7460 µL/kg

LD₅₀ (Skin-Rabbit) > 16 mL/kg

TRIMETHYLATED SILICA:

Currently, there are no toxicological data for this compound.

XYLENES (MIXED ISOMERS):

Standard Draize Test (Eye-Human) 200 ppm

LDLo (Oral-Human) 50 mg/kg

LCLo (Inhalation-Human) 10,000 ppm/6 hours: Behavioral: general anesthetic; Lungs, Thorax, or Respiration: cyanosis; Blood: other changes

TCLo (Inhalation-Human) 200 ppm: Sense Organs and Special Senses: Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): conjunctive irritation; Lungs, Thorax, or Respiration: other changes

Standard Draize Test (Skin-Rabbit) 100%: Moderate

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

Standard Draize Test (Eye-Rabbit) 87 mg: Mild

Standard Draize Test (Eye-Rabbit) 5 mg/24 hours: Severe

LD₅₀ (Oral-Rat) 4300 mg/kg: Liver: other changes; Kidney, Ureter, Bladder: other changes

LD₅₀ (Oral-Mouse) 2119 mg/kg

XYLENES (MIXED ISOMERS) [continued]:

LD₅₀ (Oral-Mammal-Species Unspecified) 4300 mg/kg

LD₅₀ (Intraperitoneal-Rat) 2459 mg/kg

LD₅₀ (Subcutaneous-Rat) 1700 mg/kg

LD₅₀ (Skin-Rat) > 1700 mg/kg

LDLo (Intravenous-Rabbit) 129 mg/kg

LDLo (Intraperitoneal-Guinea Pig) 2 gm/kg:

Liver: fatty liver degeneration; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other transferases

LDLo (Intraperitoneal-Mammal-Species Unspecified) 2 gm/kg: Peripheral Nerve and Sensation: flaccid paralysis without anesthesia (usually neuromuscular blockage); Behavioral: convulsions or effect on seizure threshold, irritability

TDLo (Oral-Rat) 28 gm/kg/14 days-continuous: Related to Chronic Data: death

TDLo (Oral-Rat) 63 gm/kg/90 days-intermittent: Liver: changes in liver weight; Endocrine: changes in adrenal weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Mouse) 28 gm/kg/14 days-continuous: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Mouse) 20,600 µg/kg: female 6-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: craniofacial (including nose and tongue), musculoskeletal system

TDLo (Oral-Mouse) 31 mg/kg: female 6-15 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

TDLo (Intraperitoneal-Rat) 4128 mg/kg/3 days-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: peptidases

LC₅₀ (Inhalation-Rat) 5000 ppm/4 hours

LC₅₀ (Inhalation-Mammal-Species Unspecified) 30 gm/m³

LCLo (Inhalation-Guinea Pig) 450 ppm: Lungs, Thorax, or Respiration: other changes; Liver: fatty liver degeneration

TCLo (Inhalation-Rat) 1600 ppm/20 hours/7 days-intermittent: Behavioral: general anesthetic; Blood: changes in erythrocyte (RBC) count; Related to Chronic Data: death

TCLo (Inhalation-Rat) 15 mg/m³/24 hours/85 days-continuous: Brain and Coverings: recordings from specific areas of CNS; Blood: changes in leukocyte (WBC) count

TCLo (Inhalation-Rat) 800 ppm/14 hours/6 weeks-intermittent: Sense Organs and Special Senses (Ear): change in acuity

TCLo (Inhalation-Rat) 300 ppm/6 hours/18 weeks-intermittent: Liver: other changes; Kidney, Ureter, Bladder: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)

XYLENES (MIXED ISOMERS) [continued]:

TCLo (Inhalation-Rat) 12,740 µg/kg/30 days-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases, Enzyme inhibition, induction, or change in blood or tissue levels: transaminases

TCLo (Inhalation-Rat) 1000 ppm/6 hours/8 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TCLo (Inhalation-Rat) 2000 ppm/6 hours/8 days-intermittent: Behavioral: food intake (animal)...

TCLo (Inhalation-Rat) 250 mg/m³/24 hours: female 7-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system

TCLo (Inhalation-Rat) 50 mg/m³/6 hours: female 1-21 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: craniofacial (including nose and tongue)

TCLo (Inhalation-Rat) 50 mg/m³/6 hours: female 1-21 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system, other developmental abnormalities; Effects on Newborn: growth statistics (e.g.%, reduced weight gain)

TCLo (Inhalation-Rat) 200 ppm/6 hours: female 4-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system; Effects on Newborn: behavioral

TCLo (Inhalation-Mouse) 1250 mg/m³/2 hours/60 days-intermittent: Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases; Related to Chronic Data: changes in testicular weight

TCLo (Inhalation-Monkey) 100 mg/m³/90 days-intermittent: Blood: other changes

TCLo (Inhalation-Mouse) 4000 ppm/6 hours: female 6-12 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain), physical

TCLo (Inhalation-Mouse) 2000 ppm/6 hours: female 6-12 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TCLo (Inhalation-Mouse) 1 gm/m³/12 hours: female 6-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: musculoskeletal system

TCLo (Inhalation-Rabbit) 500 mg/m³/24 hours: female 7-20 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TCLo (Inhalation-Rabbit) 1 gm/m³/24 hours: female 7-20 day(s) after conception: Reproductive: Fertility: abortion

11. TOXICOLOGICAL INFORMATION (Continued)

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

XYLENES: ACGIH TLV-A3 (Confirmed Animal Carcinogen); EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available); EPA-I (Data are Inadequate for an Assessment of Human Carcinogenic Potential); IARC-3 (Not Classifiable as to Carcinogenicity to Humans); ACGIH-TLV-A Compound (Not Classifiable as a Human Carcinogen)

The remaining component of this product is not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore is neither considered to be nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: This product can be irritating to eyes, skin, and other contaminated tissue.

SENSITIZATION TO THE PRODUCT: No component of this product is known to be a human skin or respiratory sensitizer.

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

Mutagenicity: 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. Mixed Xylenes are considered fetotoxic in humans, based on observations of reduced fetal weight, delayed ossification and persistent behavioral effects in animal studies in the absence of maternal toxicity. Other developmental effects have been observed in animal studies in the presence of maternal toxicity.

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.

ACGIH 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
Xylenes • Methylhippuric Acids in urine	• End of Shift	• 1.5 g/g Creatinine

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

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

XYLENES:

Aquatic Fate: Based on a recommended classification scheme and experimentally determined Koc values in the range of 39-359, Xylene is expected to adsorb somewhat to suspended solids and sediment in water. Xylene is expected to volatilize from water surfaces based on an experimental Henry's Law constant of 7.0×10^{-3} atm-cu m/mole reported for a mixture of Xylene isomers. Estimated half-lives for a model river and model lake are 3 and 99 hours, respectively. Xylene is degraded in standard biodegradability and field tests using various inocula including sewage, activated sludge and seawater.

Atmospheric Fate: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, Xylene, which has an experimental vapor pressure of 7.99 mm Hg at 25°C, will exist solely as a vapor in the ambient atmosphere. Vapor-phase Xylene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the atmospheric lifetime of Xylene is about 1-2 days. Ambient levels of Xylene are detected in the atmosphere due to large emissions of this compound.

Bioconcentration: an experimental BCF value of 20 was measured for Xylene isomers in eels exposed to petroleum for 10 days. According to a classification scheme, this BCF value suggests that bioconcentration in aquatic organisms is low.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful or fatal to contaminated plant and animal life (especially if large quantities are released).

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful or fatal to contaminated aquatic plant and animal life. This material floats on water, and can potentially form slicks that are capable of creating oxygen-deprived waterways and severely contaminate coastal and shore life. The following are aquatic toxicity data for some components of this product.

XYLENE:

LD₅₀ (goldfish) 24 hours = 13 mg/L (conditions of bioassay not specified, no specific isomer)

LC₅₀ (rainbow trout) 96 hours = 13.5 mg/L (conditions of bioassay not specified, no specific isomer)

LC₅₀ (fathead minnow) 1 hour = 42 mg/L at 18-22°C, in a static bioassay (No specific isomer)

LC₅₀ (fathead minnow) 24-96 hours = 46 mg/L at 18-22°C, in a static bioassay (No specific isomer)

LC₅₀ (*Carassius auratus* goldfish) 96 hours = 16.9 ppm (conditions of bioassay not specified, no specific isomer)

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada or EU Member States. 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.

EPA WASTE NUMBER: Wastes of this product should be tested to see if they are wastes as defined under EPA criteria for D001 listed wastes (Waste Characteristic- Ignitability).

14. TRANSPORTATION INFORMATION

THIS PRODUCT IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Flammable liquid, n.o.s. (Stoddard Solvent)
HAZARD CLASS NUMBER and DESCRIPTION: 3 (Flammable)
UN IDENTIFICATION NUMBER: UN 1993
PACKING GROUP: III
DOT LABEL(S) REQUIRED: Class 3 (Flammable)
EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2004: 128

MARINE POLLUTANT: No component of this product is listed as a Marine Pollutant, per Appendix B to 49 CFR 172.101

Small Quantity Exception (49 CFR 173.4): Small quantities of Class 3 material are not subjected to other requirements of the Hazardous Materials Regulations (Subchapter C) when the maximum quantity per inner receptacle is limited to 30 mL (1 oz). Refer to 49 CFR 173.4 for specific information in packaging small quantity materials.

Limited Quantity Exceptions [49 CFR 173.150(b)]: Limited quantities for Class 3, Packing Group III materials have inner packagings not over 5.0 L net capacity each, packed in strong outer packaging.

According to 49 CFR 173.120(b)(2) and 173.150(f)(1), this product may be reclassified as a "Combustible Liquid" and exempted from certain transportation-related requirements, such as labeling, when shipped in non-bulk "Limited Quantity" containers of less than 5 liters capacity. According to 49 CFR 173.150(f)(2) and (3), this provision does not apply to "limited quantities" offered for or transported via vessel or aircraft or products which are defined as DOT "Marine Pollutants." It is recommended that "Flammable Liquid" products which are reclassified be so identified on the bill-of-lading as "Combustible liquid, n.o.s. (Stoddard Solvent) "NA1993."

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

PROPER SHIPPING NAME: Flammable liquid, n.o.s. (Stoddard Solvent)
HAZARD CLASS NUMBER and DESCRIPTION: 3 (Flammable)
UN IDENTIFICATION NUMBER: UN 1993
PACKING GROUP: III
HAZARD LABEL(S) REQUIRED: Class 3 (Flammable)
SPECIAL PROVISIONS: 16
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX: 5
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX: 60
MARINE POLLUTANT: Not applicable.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is considered as Dangerous Goods, by rules of IATA:

UN IDENTIFICATION NUMBER: UN 1993
PROPER SHIPPING NAME: Flammable liquid, n.o.s. (Stoddard Solvent)
HAZARD CLASS NUMBER and DESCRIPTION: 3 (Flammable)
PACKING GROUP: III
HAZARD LABEL(S) REQUIRED: Class 3 (Flammable)
SPECIAL PROVISIONS: A3
ERG CODE: 3L

PASSENGER AND CARGO AIRCRAFT				CARGO AIRCRAFT ONLY	
Limited Quantity		Packing Instruction	Max. Qty per Pkg	Packing Instruction	Max. Qty per Pkg
Packing Instruction	Max. Qty per Pkg				
Y309	10 L	309	60 L	310	220 L

14. TRANSPORTATION INFORMATION (Continued)

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION: This product is considered as Dangerous Goods by the International Maritime Organization.

UN IDENTIFICATION NUMBER: UN 1993
PROPER SHIPPING NAME: Flammable liquid, n.o.s. (Stoddard Solvent)
HAZARD CLASS NUMBER and DESCRIPTION: 3 (Flammable)
PACKING GROUP: III
SPECIAL PROVISIONS: 223, 274, 944, 955
HAZARD LABEL(S) REQUIRED: Class 3 (Flammable)
LIMITED QUANTITIES: 5 L
PACKING INSTRUCTION: P001, LP01
EmS: F-E, S-E
STOWAGE AND SEGREGATION: Category A

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is considered by the United Nations Economic Commission for Europe to be dangerous goods.

UN NUMBER: UN 1993
NAME AND DESCRIPTION: Flammable liquid, n.o.s. (Stoddard Solvent)
CLASS: 3
CLASSIFICATION CODE: F1
PACKING GROUP: III
LABELS: 3
SPECIAL PROVISIONS: 274, 640E
LIMITED QUANTITIES: LQ7
PACKING INSTRUCTION: P001, IBC03, LP01, R001
MIXED PACKING INSTRUCTION: MP19
HAZARD IDENTIFICATION NUMBER: 30

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act and are listed as follows:

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

U.S. CERCLA REPORTABLE QUANTITY (RQ): Xylenes = 100 kg (45.4 kg)

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

OTHER U.S. FEDERAL REGULATIONS: OSHA Standard for Flammable and Combustible Liquids (29 CFR 1910.106). Depending on specific operations involving the use of this product, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation, the components of this product are/are not listed in Appendix A (provided Threshold Quantities for Listed Substances); however, any process that involves a flammable liquid on-site, in one location, in quantities of 10,000 lb. (4,553 kg) or greater is covered under this regulation unless it is used as a fuel. Vegetable Oils, such as the Linseed Oil components of this product, are considered OSHA Table Z-1-A air contaminants. The components of this product have requirements under other U.S. Federal regulations as follows:

XYLENE: Xylene is listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Xylenes are included on this list. Xylene is designated as a hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of Xylene.

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 AND VAPOR. MAY CAUSE RESPIRATORY, SKIN AND EYE IRRITATION. HARMFUL IF INHALED. ASPIRATION HAZARD-INGESTION CAN CAUSE LIFE-THREATENING LUNG DAMAGE. Keep away from heat, sparks, and flame. Avoid breathing mists or sprays. Avoid prolonged or repeated contact with skin. Use only with adequate ventilation. Keep container closed. Wash thoroughly after handling. Wear gloves and goggles. **FIRST-AID:** In case of contact, immediately flush skin or eyes for at least 15 minutes with large amounts of water. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If ingested, do not induce vomiting. Get medical attention immediately. **IN CASE OF FIRE:** Use foam, dry chemical, or carbon dioxide. Liquid will float and may re-ignite on the surface of water. **IN CASE OF SPILL:** Absorb spill with inert material and place in suitable container. Refer to Material Safety Data Sheet for additional information on this product.

ADDITIONAL CANADIAN REGULATIONS:

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

OTHER CANADIAN REGULATIONS: Not applicable.

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

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: **Class B2:** Flammable Liquid

Class D2B: Materials Causing Other Toxic Effects/Toxic Material (irritation).



EUROPEAN UNION INFORMATION FOR PRODUCT:

EU LABELING AND CLASSIFICATION: This product meets the following definitions, per the European Union Council Directives.

EU CLASSIFICATION: [T] Toxic; Carcinogenic Category 2; F [Flammable]

EU RISK PHRASES: [R: 10]: Flammable. [R: 45]: May cause cancer. [R: 65]: Harmful, may cause lung damage if swallowed.

EU SAFETY PHRASES: [S: 2-]: Keep out of the reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only*). [S: 23]: Do not breathe fumes, vapors or spray. [S: 24]: Avoid contact with skin. [S: 38]: In case of insufficient ventilation, wear suitable respiratory equipment. [S: 36/37]: Wear suitable protective clothing and gloves. [S: 62]: If swallowed, do not induce vomiting. Seek medical advice immediately and show this container or label.

EUROPEAN UNION ANNEX II

HAZARD SYMBOL:



EUROPEAN UNION INFORMATION FOR CONSTITUENTS: The following information is available for primary constituents in the components of this product.

Stoddard Solvent:

EU EINECS/ELINCS NUMBER: 232-489-3

EU CLASSIFICATION: [T] Toxic; Carcinogenic Category 2

EU RISK PHRASES: [R: 45]: May cause cancer. [R: 65]: Harmful, may cause lung damage if swallowed.

EU SAFETY PHRASES: [S: 2-]: Keep out of the reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only*). [S: 23]: Do not breathe fumes, vapors or spray. [S: 24]: Avoid contact with skin. [S: 38]: In case of insufficient ventilation, wear suitable respiratory equipment. [S: 36/37]: Wear suitable protective clothing and gloves. [S: 62]: If swallowed, do not induce vomiting. Seek medical advice immediately and show this container or label.

Tetraisopropyl Titanate:

EU EINECS/ELINCS NUMBER: 200-909-6

EU CLASSIFICATION: An official classification for this substance has not been published in Commission Directives 93/72/EEC, 94/69EC, or 96/54EC.

Trimethylated Silica:

EU EINECS/ELINCS NUMBER: Unlisted

EU CLASSIFICATION: An official classification for this substance has not been published in Commission Directives 93/72/EEC, 94/69EC, or 96/54EC.

15. REGULATORY INFORMATION (Continued)

EUROPEAN UNION INFORMATION FOR PRODUCT (continued):

EUROPEAN UNION INFORMATION FOR CONSTITUENTS (continued):

XYLENES (MIXED ISOMERS):

EC EINECS/ELINCS NUMBER: 215-535-7

HAZARD CLASSIFICATION: [Xn]: Harmful. F [Flammable]

RISK PHRASES: [R: 10]: Flammable. [R: 20/21]: Harmful by inhalation and by skin contact. [R: 38]: Irritating to skin.

SAFETY PHRASES: [S: 2½-]: Keep locked-up and out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) [S: 25]: Avoid contact with eyes.

16. OTHER INFORMATION

PREPARED BY:

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DEFINITIONS OF TERMS

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

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

EXPOSURE LIMITS IN AIR:

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

LOQ: Limit of Quantitation.

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

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELS: NIOSH's Recommended Exposure Limits.

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

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

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

IDLH-Immediately Dangerous to Life and Health: This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

HEALTH HAZARD:

0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L.; **1 (Slight Hazard: Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L); **2 (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L.); **3 (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L.); **4 (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L).********

FLAMMABILITY HAZARD:

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1 (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.];**

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued):

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

PHYSICAL HAZARD:

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

PHYSICAL HAZARD (continued):

2 (continued): *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); **3** (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure \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. *Liquids*: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity*: Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides*: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives*: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases*: No Rating. *Pyrophorics*: Add to the definition of Flammability "4". *Oxidizers*: No "4" rating. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

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

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

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

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

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **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:

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

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

EUROPEAN and INTERNATIONAL:

The DFG: This is the Federal Republic of Germany's Occupation Health Agency, similar to the U.S. OSHA. **EU** is the European Union (formerly known as the **EEC**, European Economic Community). **EINECS:** This is the European Inventory of Now-Existing Chemical Substances. The **ARD** is the European Agreement Concerning the International Carriage of Dangerous Goods by Road and the **RID** are the International Regulations Concerning the Carriage of Dangerous Goods by Rail. **AICS** is the Australian Inventory of Chemical Substances. **MITI** is the Japanese Minister of International Trade and Industry