

SAFETY DATA SHEET

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

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

IDENTIFICATION of the SUBSTANCE or PREPARATION:

TRADE NAME (AS LABELED):

SRP ICON

PRODUCT CODE(S):

1931

CHEMICAL NAME/CLASS:

Polymer/Isocyanate Mixture

U.N. NUMBER:

Not Applicable

U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:

Not Applicable

RELEVANT USES of the SUBSTANCE:

Automotive Glass Polyurethane Adhesive

USES ADVISED AGAINST:

Other than Relevant Use

COMPANY/UNDERTAKING IDENTIFICATION:

U.S./DISTRIBUTOR'S NAME:

SHAT-R-PROOF CORP.

ADDRESS:

650 Pelham Boulevard, Suite 100

St Paul, MN 55114

1-800-420-8036

MEDICAL EMERGENCIES:

U.S. EMERGENCY PHONE:

CHEMTREC: 1-800-424-9300 (U.S./Canada/Puerto Rico/Virgin Islands) [24-hours]

CHEMTREC: +1-703-527-3887 (Outside North America) [24-hours]

EMAIL ADDRESS FOR SDS INFORMATION:

msds-info@novusglass.com

DATE OF PREPARATION:

May 6, 2010

DATE OF REVISION:

December 16, 2014

2. HAZARD IDENTIFICATION

OSHA HAZARD COMMUNICATION (GLOBAL HARMONIZATION) LABELING AND CLASSIFICATION: This product would be classified as follows, per OSHA's Hazard Communication Standard (29CFR §1910.1200). This is a self-classification.

Classification: Skin Irritant Category 2, Eye Irritant Category 2A

Signal Words: Warning

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

Supplemental Hazard Statements: None.

Prevention Precautionary Statements: P264: Wash thoroughly after handling. P280: Wear protective gloves/protective clothing/eye protection/face protection.

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

Storage Precautionary Statements: None.




Disposal Precautionary Statements: None.

Hazard Symbols: GHS07



EMERGENCY OVERVIEW: Product Description: This product is a black paste with an acrylic odor. **Health Hazards:** This product may irritate contaminated tissue, especially upon prolonged exposure. If heated, inhalation of high concentrations of vapors may cause dizziness, headaches, and nausea. Some components of this product exhibit carcinogenic effects in animal testing (the relevance to human occupational exposure is not known.) **Flammability Hazards:** This product is a combustible paste that can be ignited if subjected to direct flame or is highly heated. In the event of a fire, this product may decompose to release smoke, irritating vapors and toxic gases (e.g., carbon dioxide, carbon monoxide, nitrogen oxides, hydrogen cyanide, phosphorous oxides, phosphine and isocyanates). **Reactivity Hazards:** This product may react with water, when heated or in contact with amines and other incompatible materials (see Section 10. Stability and Reactivity). **Environmental Hazards:** Releases of this product to the environment, especially in large quantity, may result in environmental damage. **Emergency Recommendations:** Emergency responders must wear personal protective equipment, and appropriate fire equipment suitable for the situation to which they are responding.

3. COMPOSITION and INFORMATION ON INGREDIENTS

Chemical Name	CAS #	EINECS or ELNICS #	WT%	OSHA GHS Hazard Symbol	OSHA GHS Classification/Hazard Codes
Polypropylene Polyol-diphenyl Methane Diisocyanate Prepolymer (<0.1% free MDI)	9048-57-1		15-40%	None	Not Applicable.
Proprietary Calcium Salt			≤ 10%	None	Not Applicable.
Carbon Black	1333-86-4	215-609-9	25-50%		SELF CLASSIFICATION: Classification: Carcinogenic Cat. 2 Hazard Codes: H351
Linear Alpha Olefin	112-88-9	204-012-9	≤ 2.5%	None	Not Applicable.
C20-24 Alkene	93924-10-8	300-202-1	≤ 2.5%	None	Not Applicable.
Proprietary Phthalate Ester			10-30%	None	Not Applicable.
Triphenyl Phosphite	101-02-0	202-908-4	≤ 2.5%		Classification: Eye Irritant Cat. 2, Skin Irritant Cat. 2, Aquatic Toxicity Acute Cat. 1, Aquatic Toxicity Chronic Cat. 1 Hazard Codes: H315, H319, H410
Methylene Bisphenol Isocyanate	101-68-8	202-966-0	< 0.1%		Classification: Carcinogenic Cat. 2, Acute Toxicity Cat. 4, Eye Irritant Cat. 2A, Skin Irritant Cat. 2, Respiratory Sensitizer Cat. 1, Skin Sensitizer Cat. 1, STOT RE 2, STOT SE 3 Hazard Codes: H315, H317, H319, H332, H334, H335, H351, H373

4. FIRST-AID MEASURES

DESCRIPTION OF FIRST AID MEASURES: Contaminated individuals should be taken for medical attention if they feel unwell or if adverse effects occur. Take copy of label and SDS to physician or health professional with contaminated individual.

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

EYE EXPOSURE: If this product enters the eyes, open contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have contaminated individual "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing. Contaminated individual must seek medical attention if any adverse effect occurs.

INHALATION: If this product is inhaled, remove contaminated individual to fresh air. If adverse effect occurs, seek medical attention.

INGESTION: If this material is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

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

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin disorders may be aggravated by prolonged overexposure to this product.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Treat symptoms and eliminate overexposure. Consider gastric lavage with activated charcoal in event of ingestion.

5. FIRE-FIGHTING MEASURES

FLASH POINT: > 93.3°C (> 200°F)

AUTOIGNITION TEMPERATURE: Not determined.

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

FIRE EXTINGUISHING MATERIALS: Use extinguishing material suitable to the surrounding fire.

Halon: Yes Carbon Dioxide: Yes Water Spray: For cooling of containers only

Foam: Yes Dry Chemical: Yes Other: Any "ABC" Class

FIRE EXTINGUISHING MATERIALS NOT TO BE USED: Water.

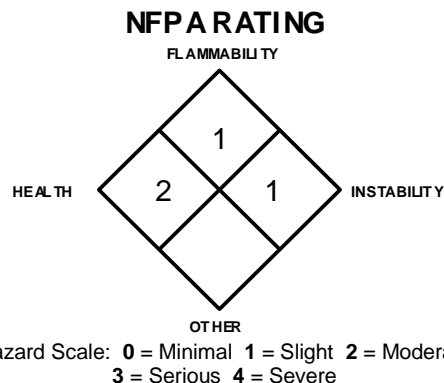
UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g., carbon dioxide, carbon monoxide, nitrogen oxides, hydrogen cyanide, phosphorous oxides, phosphine and isocyanates). The vapors of this product may travel to a source of ignition, and flashback to a leak or open container.

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: This product may accumulate static charge, and so may ignite.

5. FIRE-FIGHTING MEASURES, continued

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if it can be done without risk to personnel. Water spray can be used to cool fire-exposed containers. Water fog or spray can also be used by trained fire-fighters 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

SPILL AND LEAK RESPONSE: Proper protective equipment should be used. In the event of a spill, clear the area and protect people. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment) if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA).

Small Spills: Wear rubber gloves, splash goggles, and appropriate body protection. Wipe up spilled paste with polypads or other suitable absorbent materials. Wash contaminated area with soap and water, absorb with paper towels, and rinse with water.

Large Spills: Trained personnel following pre-planned procedures should handle non-incident releases. Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Wipe up spilled paste with polypads or other suitable absorbent materials. Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Monitor area and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

Place all spill residue in an appropriate container and seal. Decontaminate the area thoroughly. If necessary, discard all stained response equipment or rinse with soapy water before returning such equipment to service. 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.

7. HANDLING AND STORAGE

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

CONDITIONS FOR SAFE STORAGE: Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

SPECIFIC END USES: This product is used as a windshield replacement adhesive.

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.

8. EXPOSURE CONTROLS – PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Engineering controls such as closed systems and ventilation should be the principal method for minimizing isocyanate exposure in the workplace. Exhaust ventilation systems should be designed to capture and contain vapors and particulates. Where appropriate, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Ensure eyewash/safety shower stations are available near areas where this product is used. Ventilation equipment should be checked for adequate performance at least every 3 months.

EXPOSURE LIMITS:

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	
Proprietary Calcium Salt		NE	NE	15 (total dust), 5 (resp. fraction)	NE	15 (total dust), 5 (resp. fraction)	NE	NE	NE
Carbon Black	1333-86-4	3.5 NIC = 3 (inhalable fraction)	NE	3.5	NE	3.5 (0.1 in presence of PAHs as PAHs; 10-hr TWA)	NE	1750	DFG MAK: As inhalable dust Carcinogen: IARC-2B, MAK-3B, NIOSH-Ca, TLV-A4; NIC = TLV-A3
Linear Alpha Olefin	112-88-9	NE	NE	NE	NE	NE	NE	NE	NE
Proprietary Phthalate Ester		NE	NE	NE	NE	NE	NE	NE	NE
Methylene Bisphenol Isocyanate	101-68-8	0.051	NE	NE	0.2 (ceiling)	0.05	0.2 (ceiling) 10 min.	75	DFG MAKs: TWA = 0.01 (inhalable fraction) skin; Danger of Sensitization of the Airways and the Skin PEAK = 1•MAK 15 min. average value, 1-hr interval, 4 per shift; 0.1 (ceiling) DFG MAK Pregnancy Risk Classification: D Carcinogen: EPA-CBD, EPA-D, IARC-3, MAK-4
Polypropylene Polyol MDI Prepolymer	9048-57-1	NE	NE	NE	NE	NE	NE	NE	NE
Triphenyl Phosphite	101-02-0	NE	NE	NE	NE	NE	NE	NE	NE

NE = Not Established. NIC = Notice of Intended Change

INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS: In addition to the exposure limit values cited above, other exposure limits have been established by various countries for some components of this mixture. Individual country regulatory authorities should be checked to ensure no new limits are available.

CALCIUM SALT:

Belgium: TWA = 10 mg/m³, MAR 2002
 Hungary: TWA = 10 mg/m³, SEP 2000
 Japan: OEL = 1 mg/m³ (respirable), 4 mg/m³ (total), APR 2007
 Korea: TWA = 10 mg/m³, 2006
 Mexico: TWA = 10 mg/m³; STEL 20 mg/m³ (inhalable), 2004
 The Netherlands: MAC-TGG = 10 mg/m³, 2003
 New Zealand: TWA = 10 mg/m³ (inspirable dust), JAN 2002
 Poland: MAC(TWA) dust = 10 mg/m³, JAN 1999
 Russia: STEL = 6 mg/m³, JUN 2003
 Switzerland: MAK-W = 3 mg/m³, DEC 2006
 United Kingdom: TWA = 10 mg/m³ (inhalable), 2005
 United Kingdom: TWA = 4 mg/m³ (respirable), 2005
 In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

CARBON BLACK:

Australia: TWA = 3 mg/m³, JUL 2008
 Belgium: TWA = 3.6 mg/m³, MAR 2002
 Denmark: TWA = 3.5 mg/m³, OCT 2002
 Finland: TWA = 3.5 mg/m³, STEL = 7 mg/m³, SEP 2009
 France: VME = 3.5 mg/m³, FEB 2006
 Japan: OEL = 1 mg/m³ (respirable), 4 mg/m³ (total), APR 2007
 Korea: TWA = 3.5 mg/m³, 2006
 Mexico: TWA = 3.5 mg/m³; STEL = 7 mg/m³, 2004
 The Netherlands: MAC-TGG = 3.5 mg/m³, 2003
 New Zealand: TWA = 3 mg/m³, JAN 2002
 Norway: TWA = 3.5 mg/m³, JAN 1999
 The Philippines: TWA = 3.5 mg/m³, JAN 1993
 Russia: STEL = 4 mg/m³, JUN 2003

Sweden: TWA = 3 mg/m³, JUN 2005
 United Kingdom: TWA = 3.5 mg/m³; STEL = 7 mg/m³, 2005
 In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV
PROPRIETARY PHTHALATE ESTER:
 New Zealand: TWA = 5 mg/m³, JAN 2002
METHYLENE BISPHENOL ISOCYANATE:
 Australia: TWA = 0.02 mg(NCO)/m³, STEL 0.07 mg(NCO)/m³, JUL 2008
 Belgium: TWA = 0.005 ppm (0.052 mg/m³), MAR 2002
 Denmark: TWA = 0.005 ppm (0.05 mg/m³), OCT 2002
 France: VME = 0.01 ppm (0.1 mg/m³), VLE = 0.02 ppm (0.2 mg/m³), FEB 2006
 Germany: MAK = 0.05 mg/m³ (airway and skin, sen), 2005
 Hungary: TWA = 0.05 mg/m³, STEL = 0.05 mg/m³, SEP 2000
 Japan: OEL = 0.05 mg/m³, sen, APR 2007
 Korea: TWA = 0.005 ppm (0.055 mg/m³), 2006
 Mexico: TWA = 0.005 ppm (0.051 mg/m³), 2004
 The Netherlands: MAC-TGG = 0.05 mg/m³, 2003
 New Zealand: TWA = 0.02 mg(NCO)/m³; STEL = 0.07 mg(NCO)/m³, sen, JAN 2002
 The Philippines: TWA = 0.02 ppm (0.2 mg/m³), JAN 1993
 Poland: MAC(TWA) = 0.05 mg/m³, MAC(C) = 0.2 mg/m³, JAN 1999
 Russia: STEL = 0.5 mg/m³, Skin, JUN 2003
 Sweden: TWA=0.002ppm (0.03 mg/m³), CL=0.005ppm (0.05 mg/m³), Sen, JUN 2005
 Switzerland: MAK-W = 0.005 ppm (0.02 mg/m³), KZG-W = 0.005 ppm (0.02 mg/m³), DEC 2006
 Thailand: TWA = 0.02 ppm (0.2 mg/m³), JAN 1993
 In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV
TRIPHENYL PHOSPHITE:
 Russia: STEL = 0.1 mg/m³, Skin, JUN 2003

8. EXPOSURE CONTROLS – PERSONAL PROTECTION, continued

PROTECTIVE EQUIPMENT: *The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standards of Canada. Please reference applicable regulations and standards for relevant details.*

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in this section, if applicable. If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134 or applicable State regulations. For operations in which mists or sprays of this product will be generated use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, or Canadian CSA Standard Z94.4-93.

DIPHENYL METHANE DIISOCYANATE (METHYLENE BISPHENOL ISOCYANATE)

CONCENTRATION

Up to 0.5 mg/m³.
Up to 1.25 mg/m³.
Up to 2.5 mg/m³.
Up to 75 mg/m³.

RESPIRATORY PROTECTION

Any Supplied-Air Respirator (SAR).
Any SAR operated in a continuous-flow mode.
Any Self-Contained Breathing Apparatus(SCBA) with a full facepiece, or any SAR with a full facepiece.
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 having a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

EYE PROTECTION: If necessary, refer to U.S. OSHA 29 CFR 1910.133 or the Canadian CSA Standard Z94.3-M1982, *Industrial Eye and Face Protectors* for further information.

HAND PROTECTION: Polyvinyl alcohol, polyethylene/ethylene vinyl alcohol, 4H™, Barricade™, or Responder™ gloves. Natural rubber, butyl rubber, neoprene, polyvinyl chloride, and nitrile gloves are not recommended. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada for further information.

BODY PROTECTION: None normally needed under typical circumstances of use. If necessary, use body protection appropriate for task (e.g., Tyvek suit, rubber apron). If necessary, refer to appropriate Standards of Canada for further information. 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, as described in U.S. OSHA 29 CFR 1910.136 Canadian CSA Standard Z195-M1984, *Protective Footwear*.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Viscous Paste.

COLOR: Black.

MOLECULAR FORMULA: Mixture.

MOLECULAR WEIGHT: Mixture.

ODOR: Acrylic.

ODOR THRESHOLD: Not established for product.

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

EVAPORATION RATE (nBuAc = 1): Not established for product.

SPECIFIC GRAVITY (water = 1): Not established for product.

MELTING/FREEZING POINT: Not established for product .

BOILING POINT: Not established for product.

SOLUBILITY IN WATER: Insoluble.

VAPOR PRESSURE: < 110kPa

pH: Not established for product.

% VOLATILE: Not established for product.

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

HOW TO DETECT THIS SUBSTANCE (warning properties): The odor and appearance of this product may act as a warning of this product.

10. STABILITY AND REACTIVITY

STABILITY: Stable under conditions of normal temperature and pressure. Contact with water and incompatible materials can evolve heat, which can cause an overpressure of closed containers in the event of heating of the container or exposure to high temperatures.

DECOMPOSITION PRODUCTS: *Combustion:* Carbon oxides, benzene, toluene, nitrogen oxides, hydrogen cyanide, phosphorous oxides, phosphine and isocyanates. *Hydrolysis:* Carbon dioxide, ureas, methylene dianiline, heat.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with strong oxidizing agents, acids, alkalies, alcohols, amines and water. Reactions may be exothermic.

HAZARDOUS REACTIONS: May occur if highly heated or in contact with amines or water.

CONDITIONS TO AVOID: Contact with incompatible chemicals, exposure to elevated temperatures.

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:

The most significant routes of occupational overexposure is contact with skin and eyes. The symptoms of overexposure to this product, via route of exposure, are as follows:

INHALATION: Due to the paste form of this product, inhalation exposure is minimized. If heated, fumes generated may cause irritation of the respiratory system. Symptoms may include coughing, headache, sneezing, breathing difficulty and lightheadedness. This product may contain isocyanates, which are known human respiratory sensitizers. Susceptible individuals may experience allergic reaction. Symptoms can include difficulty breathing, coughing, sneezing, throat constriction and wheezing. Sensitized individuals may experience reaction after exposure to very low concentration.

CONTACT WITH SKIN or EYES: Skin contact may cause reddening, discomfort, and irritation. Repeated or prolonged contact may result in defatting, redness, itching, inflammation, cracking and possible secondary infection. Direct contact with the eyes can be moderately to severely irritating and will result in immediate pain and tearing. Vapors of the product may cause watering and irritation of the eyes. This product contains isocyanates, which are known human skin sensitizers. Susceptible individuals may experience allergic reaction. Symptoms can include redness, itching, rash, burning sensation, and welts. Once sensitized, exposure to very low concentration can result in reaction.

SKIN ABSORPTION: Component of this product may be absorbed via intact skin. All skin contact should be avoided.

INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If this material is swallowed, it may cause nausea, diarrhea, and vomiting. A danger of aspiration into the lungs exists after ingestion and can cause damage to the tissues of the lungs, resulting in chemical pneumonia and edema (accumulation of fluid in the lungs). Ingestion of large quantities of this product may be fatal.

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

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

ACUTE: This product may irritate the eyes, skin, and mucous membranes. Fumes from product may be harmful. Ingestion may be harmful or fatal.

CHRONIC: Prolonged or repeated skin contact may cause dermatitis (inflammation of the skin, resulting in redness and dryness). Exposure to product may cause skin and respiratory reaction in susceptible individuals. Subsequent low level contact may cause reaction. Components of this product are suspect carcinogens. Chronic exposure may cause adverse liver effects, based on animal data and adverse respiratory and blood effects.

TARGET ORGANS: Acute: Skin, eyes. **Chronic:** Skin.

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

PROPRIETARY CALCIUM SALT:

TDLo (Intravenous-Rat) 30 mg/kg: Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: changes in lung weight; Blood: other changes

TCLo (Inhalation-Rat) 84 mg/m³/4 hours/40 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial); Liver: other changes; Kidney/Ureter/Bladder: other changes

TCLo (Inhalation-Rat) 250 mg/m³/2 hours/24 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis)

CARBON BLACK:

LD₅₀ (Oral-Rat) > 15 400 mg/kg: Behavioral: somnolence (general depressed activity)

LD₅₀ (Skin-Rabbit) > 3 gm/kg

TCLo (Inhalation-Rat) 7 mg/m³: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 1.66 mg/m³/7 hours: Lungs, Thorax, or Respiration: sputum; Blood: changes in leukocyte (WBC) count; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

CARBON BLACK (continued):

TCLo (Inhalation-Rat) 229 mg/m³/6 hours: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m³: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m³/6 hours/90 days-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Rat) 1 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration - other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 1 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): other, Metabolism (Intermediary): effect on inflammation or mediation of inflammation

CARBON BLACK (continued):

TCLo (Inhalation-Rat) 7 mg/m³/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): other

TCLo (Inhalation-Rat) 11,600 µg/m³/18 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors

TCLo (Inhalation-Mouse) 50 mg/m³/6 hours: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

TCLo (Inhalation-Mouse) 1 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Mouse) 1 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

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

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

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

11. TOXICOLOGICAL INFORMATION, continued

TOXICITY DATA (continued):

CARBON BLACK (continued):

TCLo (Inhalation-Mouse) 7 mg/m³/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Hamster) 7 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Hamster) 50 mg/m³/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

TDLo (Oral-Mouse) 20,000 µg/kg/4 weeks-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Rat) 11 gm/kg/4 weeks-intermittent: Blood: pigmented or nucleated red blood cells; Liver: changes in liver weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Intravenous-Rat) 10 mg/kg/2 minutes: Liver: changes in liver weight; Blood: changes in spleen

TDLo (Intravenous-Rat) 10 mg/kg/2 minutes: Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)

TDLo (Intratracheal-Rat) 16 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Rat) 15 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: cytochrome oxidases (including oxidative phosphorylation)

TDLo (Intratracheal-Rat) 10 mg/kg: Lungs, Thorax, or Respiration: sputum; Biochemical: Metabolism (Intermediary): other proteins; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 1000 µg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 20 mg/kg/4 days-intermittent: Lungs, Thorax, or Respiration: sputum; Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 4000 µg/kg/4 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Parenteral-Mouse) 36 µg/kg/3 days-intermittent: Immunological Including Allergic: increase in humoral immune response

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 1 mg/plate

DNA Adduct (Inhalation-Mouse) 6200 µg/m³/16 hours/12 weeks-intermittent

DNA Damage (Human Lymphocyte) 16 µg/L/48 hours

DNA Damage (Inhalation-Rat) 50 µg/L/13 weeks-intermittent

DNA Damage (Inhalation-Rat) 50 gm/L/13 weeks

TCLo (Inhalation-Rat) 50 mg/m³/6 hours/90 days-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Rat) 11,600 µg/m³/18 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors

CARBON BLACK (continued):

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 1 mg/plate

DNA Adduct (Inhalation-Mouse) 6200 µg/m³/16 hours/12 weeks-intermittent

DNA Damage (Human Lymphocyte) 16 µg/L/48 hours

PROPRIETARY PHTHALATE ESTER:

TDLo (Oral-Rat) 900 mg/kg: Kidney/Ureter/Bladder: other changes

TDLo (Oral-Rat) 11,256 mg/kg/28 days-continuous: Liver: other changes, changes in liver weight; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)

TDLo (Oral-Rat) 109 gm/kg/13 weeks-continuous: Kidney/Ureter/Bladder: changes in bladder weight; Blood: normocytic anemia; Related to Chronic Data: changes in uterine weight

TDLo (Oral-Rat) 450 mg/kg/5 days-intermittent: Kidney/Ureter/Bladder: other changes

TDLo (Oral-Rat) 10 gm/kg: female 6-15 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (Oral-Rat) 18 gm/kg: female 15-21 day(s) after conception lactating female 10 day(s) post-birth: Reproductive: Specific Developmental Abnormalities: endocrine system

TDLo (Oral-Rat) 11.25 gm/kg: female 7-21 day(s) after conception: Reproductive: Specific Developmental Abnormalities: endocrine system

TDLo (Oral-Rat) 17.4 gm/kg: female 7-22 day(s) after conception lactating female 1-13 day(s) post-birth: Reproductive: Effects on Newborn: physical, other postnatal measures or effects

TDLo (Oral-Rat) 10.2 gm/kg: female 7-22 day(s) after conception lactating female 1 day(s) post-birth: Reproductive: Effects on Newborn; other postnatal measures or effects

TDLo (Oral-Rat) 400 mg/kg: female 6-15 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth)

TDLo (Oral-Rat) 10 gm/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system, urogenital system

TDLo (Oral-Rat) 10 gm/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system; urogenital system, other developmental abnormalities

TDLo (Oral-Rat) 8250 mg/kg: female 14-21 day(s) after conception lactating female 3 day(s) post-birth: Reproductive: Specific Developmental Abnormalities: cardiovascular (circulatory) system; Specific Developmental Abnormalities: other developmental abnormalities

TDLo (Oral-Rat) 11.3 gm/kg: female 7-21 day(s) after conception: Reproductive: Specific Developmental Abnormalities: urogenital system

TDLo (Oral-Rat) 18,000 mg/kg: female 15 day(s) after conception: 10 day(s) post-birth: Reproductive: Effects on Newborn: biochemical and metabolic

TDLo (Oral-Mouse) 201 gm/kg/2 years-continuous: Tumorigenic: carcinogenic by RTECS criteria; Liver: tumors

TRIPHENYL PHOSPHITE:

Standard Draize Test (Skin-Human) 125 mg/48 hours: Severe

Standard Draize Test (Skin-Rabbit) 500 mg: Severe

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

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

LC (Inhalation-Rat) > 6700 mg/m³/1 hour

LD₅₀ (Oral-Rat) 444 mg/kg

TRIPHENYL PHOSPHITE (continued):

LD₅₀ (Oral-Mouse) 1080 mg/kg

LD₅₀ (Intraperitoneal-Rat) 250 mg/kg

LD₅₀ (Intraperitoneal-Mouse) 266 mg/kg

LD₅₀ (Intraperitoneal-Mammal-Species Unspecified) 250 mg/kg: Brain and Coverings: other degenerative changes; Behavioral: convulsions or effect on seizure threshold; Cardiac: other changes

LD₅₀ (Unreported-Rat) 1490 mg/kg: Behavioral: somnolence (general depressed activity), tremor, changes in motor activity (specific assay)

LD₅₀ (Unreported-Mouse) 1360 mg/kg: Behavioral: somnolence (general depressed activity), tremor, changes in motor activity (specific assay)

LDLo (Oral-Chicken) 250 mg/kg: Behavioral: ataxia

LDLo (Skin-Rabbit) 5 gm/kg: Behavioral: somnolence (general depressed activity)

LDLo (Subcutaneous-Rat) 2 gm/kg: Peripheral Nerve and Sensation: flaccid paralysis without anesthesia (usually neuromuscular blockage); Behavioral: tremor, muscle weakness

LDLo (Subcutaneous-Cat) 300 mg/kg: Behavioral: ataxia

LDLo (Subcutaneous-Chicken) 375 mg/kg: Behavioral: food intake (animal), ataxia

LDLo (Intraperitoneal-Cat) 100 mg/kg: Peripheral Nerve and Sensation: spastic paralysis with or without sensory change; Behavioral: somnolence (general depressed activity), tremor

LDLo (Intravenous-Chicken) 50 mg/kg: Autonomic Nervous System: ganglion blocker

TDLo (Skin-Chicken) 5 gm/kg/5 days-intermittent: Behavioral: ataxia; Skin and Appendages: dermatitis, other (after systemic exposure); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase

TDLo (Subcutaneous-Rat) 3552 mg/kg/7 days-intermittent: Brain and Coverings: recordings from specific areas of CNS Autonomic Nervous System: other (direct) parasympathomimetic; Behavioral: ataxia

TDLo (Subcutaneous-Chicken) 500 mg/kg: Brain and Coverings: other degenerative changes; Spinal Cord: other degenerative changes; Peripheral Nerve and Sensation: recording from peripheral motor nerve

TDLo (Subcutaneous-Chicken) 500 mg/kg: Brain and Coverings: other degenerative changes; Spinal Cord: other degenerative changes Peripheral Nerve and Sensation: flaccid paralysis without anesthesia (usually neuromuscular blockage)

TDLo (Subcutaneous-Mammal-Species Unspecified) 1184 mg/kg: Spinal Cord: other degenerative changes; Sense Organs and Special Senses (Eye): optic nerve neuropathy, effect, not otherwise specified

TDLo (Subcutaneous-Mammal-Species Unspecified) 1184 mg/kg: Brain and Coverings: other degenerative changes; Sense Organs and Special Senses (Eye): optic nerve neuropathy, retinal changes (pigmentary depositions, retinitis, other)

TDLo (Parenteral-Rat) 1500 mg/kg/5 days-intermittent: Behavioral: ataxia, alteration of classical conditioning, Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TDLo (Parenteral-Rat) 1500 mg/kg/5 days-intermittent: Brain and Coverings: other degenerative changes Spinal Cord: other degenerative changes; Peripheral Nerve and Sensation: flaccid paralysis without anesthesia (usually neuromuscular blockage)

TCLo (Inhalation-Mammal-Species Unspecified) 9 mg/m³/4 hours/45 days-intermittent: Blood: changes in erythrocyte (RBC) count, changes in leukocyte (WBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain

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

CARBON BLACK: ACGIH-TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-2B (Possibly Carcinogenic to Humans); MAK-3B (Substances Which Cause Concern that They Could Be Carcinogen for Man. Substances for which in-vitro tests or animal studies have yielded evidence of carcinogenic effect that is not sufficient for classification of the substance in one of the other categories. Further studies are required before a final classification can be made.); NIOSH-Ca (Potential Occupational Carcinogen, with No Further Categorization); Notice of Intended Change = ACGIH TLV-A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)

METHYLENE BISPHENOL ISOCYANATE: EPA-CBD (Cannot Be Determined); EPA-D (Not Classifiable as to Human Carcinogenicity); IARC-3 (Unclassifiable as to Carcinogenicity to Humans); MAK-4 (Substances with Carcinogenic Potential for Which Genotoxicity Plays No or at Most, a Minor Role. No significant contribution to human cancer risk is expected, provided the MAK value is observed.)

DI-ISONONYL PHTHALATE: On December 20, 2013, the State of California added this chemical to their list of "chemicals known to the State to cause cancer or reproductive toxicity" (Proposition 65 List), because their State's Qualified Experts determined that there was evidence to indicate this chemical can cause cancer.

The remaining components are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, GERMAN MAK, IARC, or ACGIH and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product may be mildly irritating to contaminated, skin, and moderately to severely irritating to the eyes and mucous membranes.

11. TOXICOLOGICAL INFORMATION, continued

SENSITIZATION TO THE PRODUCT: Components of this product are suspect human respiratory and skin sensitizers. Subsequent exposure to susceptible individuals may result in allergic respiratory reaction.

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

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

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH 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 some components.

PROPRIETARY PHTHALATE ESTER:

The Koc of Proprietary Phthalate Ester is estimated as 10,600, using a water solubility of 0.20 mg/L and a regression-derived equation. According to a classification scheme, this estimated Koc value suggests that Proprietary Phthalate Ester is expected to be immobile in soil.

METHYLENE BISPHENOL ISOCYANATE:

Methylene Bisphenol Isocyanate hydrolyzes rapidly in aqueous solution; therefore, bioconcentration will not be environmentally important. Exposure of carp to 0.00001% concentration of Methylene Bisphenol Isocyanate for an eight week period resulted in no accumulations of isocyanates.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. The following information is available for some components.

PROPRIETARY PHTHALATE ESTER:

If released to air, a vapor pressure of 5.4X10⁻⁷ mm Hg at 25°C indicates Proprietary Phthalate Ester will exist in both the vapor and particulate phases in the atmosphere. Vapor-phase Proprietary Phthalate Ester will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 16 hours. Particulate-phase Proprietary Phthalate Ester will be removed from the atmosphere by wet or dry deposition. Proprietary Phthalate Ester does contain chromophores that absorb at wavelengths > 290 nm and therefore may be susceptible to direct photolysis by sunlight. If released to soil, Proprietary Phthalate Ester is expected to have no mobility based upon an estimated Koc of 10,600. Volatilization from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 1.5X10⁻⁶ atm-cu m/mole. However, adsorption to soil is expected to attenuate volatilization. Biodegradation of Proprietary Phthalate Ester in soil is expected based on studies done with starting concentrations of 45, 35, and 100 ppm using activated sludge inoculum and a 28 day incubation period giving 70, 57, and 71% degradation, respectively. If released into water, Proprietary Phthalate Ester is expected to adsorb to suspended solids and sediment based upon the estimated Koc. Proprietary Phthalate Ester had primary degradation of >95% in 12 days from a starting concentration of 1ppm in fresh water. Ultimate degradation of Proprietary Phthalate Ester in fresh water was <1 to 8% in 28 days with starting concentrations of 0.02 to 10 ppm. Volatilization from water surfaces is expected to be an important fate process based upon this compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 50 and 370 days, respectively. However, volatilization from water surfaces is expected to be attenuated by adsorption to suspended solids and sediment in the water column. The estimated volatilization half-life from a model pond is 55 years if adsorption is considered. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important process based on estimated hydrolysis half-lives of 3.4 years and 125 days at pHs 7 and 8, respectively.

METHYLENE BISPHENOL ISOCYANATE:

If released to air, a vapor pressure of 5.0X10⁻⁶ mm Hg at 25°C indicates Methylene Bisphenol Isocyanate will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase Methylene Bisphenol Isocyanate will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 33 hours. Atmospheric degradation may also occur through contact with clouds, fog or rain. Particulate-phase Methylene Bisphenol Isocyanate will be removed from the atmosphere by wet and dry deposition. Methylene Bisphenol Isocyanate reacts readily with water to form amines and polyureas. If released to water or moist soil, Methylene Bisphenol Isocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. Since Methylene Bisphenol Isocyanate reacts with water to form amines and urea, there is very little chance that it will accumulate in the food chain.

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

PROPRIETARY PHTHALATE ESTER:

An estimated BCF of 3 was calculated in fish for Proprietary Phthalate Ester, using an estimated log Kow of 9.37 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

METHYLENE BISPHENOL ISOCYANATE:

Methylene Bisphenol Isocyanate hydrolyzes rapidly in aqueous solution; therefore, leaching and adsorption to sediment will not be environmentally important.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may cause adverse effects on terrestrial plants and animals. The following aquatic toxicity data are available for some components of this product.

PROPRIETARY PHTHALATE ESTER:

EC₅₀ (*Pseudokirchneriella subcapitata* Green algae, 2-3 instar); 96 hours = 1800 µg/L; Conditions: freshwater, static, 22-24°C, pH 7.6-7.9, hardness 25-50 mg/L CaCO₃, alkalinity 25-50 mg/L CaCO₃; Effect: decreased population abundance /> or = 95% purity
LC₅₀ (*Pimephales promelas* Fathead minnow) 96 hours = > 0.19 mg/L; flow through, 20-24°C, pH 6.6-7.2
LC₅₀ (*Pimephales promelas* Fathead minnow) 96 hours = > 0.14 mg/L; static, 20±1 deg C, pH 6.6-7.2
LC₅₀ (*Lepomis macrochirus* Bluegill sunfish) 96 hours = > 0.17 mg/L; static, 20-23°C, pH 6.6-7.2
LC₅₀ (*Cyprinodon variegatus* sheepshead minnow) 96 hours = > or = 0.52 mg/L, flow through
LC₅₀ (*Oncorhynchus mykiss* rainbow trout) 96 hours = > or = 0.16 mg/L, flow through
LC₅₀ (*Brachydanio rerio* zebra danio) 96 hours = ≥ 100 mg/L, semi-static
LC₅₀ (*Leuciscus idus* orfe) 96 hours = ≥ 500 mg/L, static
LC₅₀ (*Ictalurus punctatus* channel catfish, embryo to 4-day old larvae) 7 days = 0.42 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich

PROPRIETARY PHTHALATE ESTER (continued):

LC₅₀ (*Ictalurus punctatus* channel catfish, embryo) 3 days = 0.87 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Lepomis microlophus* redear sunfish, embryo to 4-day old larvae) 8 days = 4.67 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Lepomis microlophus* redear sunfish, embryo) 4 days = 71.85 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Bufo fowleri* Fowler's toad, embryo to 4-day old larvae) 8 days = 2.95 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Bufo fowleri* Fowler's toad, embryo) 4 days = 23.51 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Rana pipiens* leopard frog, embryo to 4-day old larvae) 8 days = 3.63 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich
LC₅₀ (*Rana pipiens* leopard frog, embryo) 4 days = 4.94 mg/L, static renewal /1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich

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 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.

EPA WASTE NUMBER: Not applicable.

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This material does NOT meet the criteria as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product does NOT meet the criteria as Dangerous Goods, per rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product does NOT meet the criteria of dangerous goods, per rules of the IMO.

15. REGULATORY INFORMATION

U.S. STATE AND FEDERAL REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are NOT 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 this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Methylene Bisphenol Isocyanate = 5000 lb (2270 kg)

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

OTHER U.S. FEDERAL REGULATIONS: The components of this product have requirements under other U.S. Federal regulations as follows:

METHYLENE BISPHENOL ISOCYANATE

CLEAN AIR ACT: Methylene Bisphenol Isocyanate 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. Methylene Bisphenol Isocyanate is included on this list.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

DI-ISONONYL PHTHALATE: On December 20, 2013, the State of California added this chemical to their list of "chemicals known to the State to cause cancer or reproductive toxicity" (Proposition 65 List), because their State's Qualified Experts determined that there was evidence to indicate this chemical can cause cancer.

ADDITIONAL CANADIAN REGULATIONS:

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

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITY SUBSTANCES LISTS: As a phthalate, the Proprietary Phthalate Ester component of this product is listed on the Substance on Environment Canada/Health Canada Pilot Project List (CEPA 1999, Section 73). Meets categorization criteria: *may present, to individuals in Canada, the greatest potential for exposure; or *are persistent or bio-accumulative in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

CANADIAN WHMIS CLASSIFICATION AND SYMBOLS:

See Section 2. In 2015 Canada adopted the Globally Harmonized System for chemical hazard classification and labeling.

16. OTHER INFORMATION

U.S. ANSI STANDARD LABELING (Z129.1): **WARNING!** CAUSES SKIN, RESPIRATORY SYSTEM AND EYE IRRITATION. CONTAINS SUSPECT CARCINOGENS. CONTAINS TRACE COMPOUND HARMFUL TO AQUATIC ORGANISMS. Keep away from heat, spark or flame. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing vapors or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, respiratory protection and eye protection, as appropriate. FIRST-AID: In case of contact, immediately flush skin or eyes with plenty of water for at least 20 minutes. If inhaled, remove to fresh air. If ingested, do not induce vomiting and get medical attention. Get medical attention if any adverse reaction occurs. IN CASE OF FIRE: Use water fog (for cooling of containers), dry chemical, CO₂, or "alcohol" foam. IN CASE OF SPILL: Absorb spill with inert material. Prevent release to the environment. Replace residue in suitable container. Consult Material Safety Data Sheet for additional information.

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09/2010: Addition of EU CLP 1272: 2008 GHS compliance.

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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 lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

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

LOQ: Limit of Quantitation.

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

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

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

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

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

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

HEALTH HAZARD: 0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L; 1 (Slight Hazard): Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L; 2 (Moderate Hazard): Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L; 3 (Serious Hazard): Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *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 IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; 2 (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, including: Liquids having a flash-point at or above 37.8°C [100°F] Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); 3 (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are

readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]; 4 (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric].

PHYSICAL HAZARD: 0 (Water Reactivity: Materials that do not react with water. Organic Peroxides: Materials that are normally stable, even under fire conditions and will not react with water. Explosives: Substances that are Non-Explosive. Unstable Compressed Gases: No Rating. Pyrophorics: No Rating. Oxidizers: No "0" rating allowed. Unstable Reactives: Substances that will not polymerize, decompose, condense or self-react.); 1 (Water Reactivity: Materials that change or decompose upon exposure to moisture. Organic Peroxides: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. Explosives: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. Compressed Gases: Pressure below OSHA definition. Pyrophorics: No Rating. Oxidizers: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)cellulose mixture and the criteria for Packing Group I and II are not met. Unstable Reactives: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); 2 (Water Reactivity: Materials that may react violently with water. Organic Peroxides: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. Explosives: Division 1.4 – Explosive substances where the explosive effect 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. Unstable Reactives: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); 3 (Water Reactivity: Materials that may form explosive reactions with water. Organic Peroxides: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. Explosives: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. Compressed Gases: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. Pyrophorics: No Rating. Oxidizers: 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.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS: (continued):

PHYSICAL HAZARD (continued):

Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the Method of Testing for Sustained Combustibility, per 49 CFR 173, Appendix H or the UN Recommendation on the Transport of Dangerous Goods, Model Regulations (current edition) and the related Manual of Tests and Criteria (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. **NATIONAL FIRE**

PROTECTION ASSOCIATION HAZARD RATINGS: (continued):

INSTABILITY HAZARD (continued)

0 (continued): Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

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

TOXICOLOGICAL INFORMATION:

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

EUROPEAN and INTERNATIONAL:

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