SAFETY DATA SHEET

Prepared to U.S. OSHA, Canadian WHMIS, and the Global Harmonization Standard

DATE OF PREPARATION: December 6, 2019
DATE OF REVISION: January 14, 2021

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

IDENTIFICATION of the SUBSTANCE or PREPARATION:

TRADE NAME: **SRP Velocity 247**
PRODUCT CODE(S): 1970

RELEVANT USES of the SUBSTANCE: Automotive Glass Polyurethane Adhesion Primer
USES ADVISED AGAINST: Other than Relevant Use

COMPANY/UNDERTAKING IDENTIFICATION:

U.S. DISTRIBUTOR'S NAME: **SRP**
ADDRESS: 650 Pelham Boulevard, Suite 100
St Paul, MN 55114

CANADIAN DISTRIBUTOR'S NAME: **FIX AUTO**
ADDRESS: 99 Émilien-Marcoux Suite 101
Blainville, Québec J7C 0B4, Canada

EMERGENCY NUMBER:

MEDICAL EMERGENCIES: 1-800-420-8036 (ProPharma) 24 hours
TRANSPORT EMERGENCIES: 1-800-424-9300 (ChemTrec) 24 hours

EMAIL ADDRESS FOR MSDS INFORMATION: msds-info@novusglass.com

2. HAZARD IDENTIFICATION

This product has been classified per GHS Standards under OSHA's Hazard Communication Standard (29CFR §1910.1200), and Canada's Hazardous Product Regulation (HPR). This is a self-classification.

GHS CLASSIFICATION:

Flammable Liquid Category 2
Carcinogenic Category 2
Skin Sensitizer Category 1
Eye Irritant Category 2A
Respiratory Sensitizer Category 1
Specific Target Organ Toxicity Single Exposure Category 3

LABEL ELEMENTS:

Signal Words: Danger

Hazard Statements:
H225: Highly flammable liquid and vapor.
H351: Suspected of causing cancer.
H317: May cause an allergic skin reaction.
H319: Causes serious eye irritation.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H336: May cause drowsiness or dizziness.

Supplemental Hazard Statements:
H066: Repeated exposure may cause skin dryness or cracking.

Precautionary Statements:
Prevention:
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting/equipment.

2. HAZARD IDENTIFICATION, continued

Precautionary Statements (continued):
Prevention (continued):
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P261: Avoid breathing fume/vapor.
P264: Wash skin thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P280: Wear protective gloves/eye protection.
P285: In case of inadequate ventilation wear respiratory protection.

Response:
P308+P313: If exposed or concerned: Get medical advice/attention.
P312: Call a POISON CENTER or physician if you feel unwell.
P363: Wash contaminated clothing before reuse.
P303 + P361 + P353 + P352: IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water. Wash skin with plenty of soap and water.
P321: Specific treatment (remove from exposure and treat symptoms).
P333 + P313: If skin irritation or rash occurs: Get medical attention.
P304 + P340 + P341: IF INHALED: If inhaled or if breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
P342 + P311: If experiencing respiratory symptoms: Call a POISON CENTER or physician.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313: If eye irritation persists: get medical attention.
P370 + P378: In case of fire: Use materials appropriate for surrounding fire for extinction.

Storage:
P403 + P233 + P235 + P405: Store locked up in a well-ventilated place. Keep container tightly closed and cool.

Disposal:
P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard Pictograms: GHS02, GHS08, GHS07



3. COMPOSITION and INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE: Mixture
CHEMICAL NAME/CLASS: Solvent/Isocyanate Mixture

Chemical Name	CAS #	WT%	OSHA/WHMIS Classification Hazard Statement and Pictogram Codes
Methyl Ethyl Ketone	78-93-3	64-66%	PUBLISHED CLASSIFICATION Classification: Flammable Liquid Category 2, Eye Irritant Category 2A, Specific Target Organ Toxicity Single Exposure Category 3 Hazard Statement Codes: H225, H319, H336, H066 Hazard Pictograms: GHS02, GHS07
Diphenylmethane-4,4'-Diisocyanate	101-68-8	0.7 – 1.0%	PUBLISHED CLASSIFICATION Classification: Carcinogenic Category 2, Acute toxicity Category 4, STOT RE 2, STOT SE 3, Respiratory Sensitization Category 1, Skin Sensitization Category 1, Eye Irritation Category 2, Skin Irritation Category 2 Hazard Statement Codes: H351, H332, H373, H335, H334, H317, H319, H318 Hazard Pictograms: GHS08, GHS07

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Chemical Name	CAS #	WT%	OSHA/WHMIS Classification Hazard Statement and Pictogram Codes
Isophorone Diisocyanate	4098-71-9	0.31-0.62%	PUBLISHED CLASSIFICATION Classification: Acute toxicity Category 1, STOT RE 2, STOT SE 3, Respiratory Sensitization Category 1, Skin Sensitization Category 1, Eye Irritation Category 2, Skin Irritation Category 2, Aquatic Chronic Toxicity Category 2 Hazard Statement Codes: H330, H335, H334, H317, H319, H318, H411 Hazard Pictograms: GHS07, GHS08
Carbon Black	1333-86-4	*	SELF CLASSIFICATION: Classification: Carcinogenic Category 2 Because carcinogenicity would be via the respiratory route and the carbon black is bound into the product matrix it does not convey this hazard to the final product. See Section 11 for carcinogenicity information. Hazard Statement Codes: H351 Hazard Pictograms: GHS08

* Proprietary Information See Section 16 for Definitions of Terms Used.

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 and central nervous system conditions 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

FIRE EXTINGUISHING MATERIALS: Use extinguishing material suitable to the surrounding fire, including halon, carbon dioxide, dry chemical and ABC class. Water spray may be used for cooling of containers.

FIRE EXTINGUISHING MATERIALS NOT TO BE USED: Water jet.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is a flammable liquid. 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). 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: Vapors of this product may be ignited by static discharge if a high concentration is allowed to accumulate.

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 should be used with care as reaction may cause generation of carbon dioxide and subsequent rupture of closed containers. 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

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Eliminate all sources of ignition before clean-up begins. Use non-sparking tools. Care should be taken as vapors of this product are heavier than air and can accumulate in low-lying pockets, creating a fire hazard. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls-Personal Protection) and at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA).

PERSONAL PROTECTIVE EQUIPMENT:

Small spills: Wear gloves, goggles and apron.
Large Spills: Not applicable due to size of containers.

METHODS FOR CLEANUP AND CONTAINMENT:

Small spills: Absorb spilled liquid with polypads or other suitable absorbent materials.
Large Spills: Not applicable due to size of containers.
All spills: Place all spill residue in a double plastic bag and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate Canadian Standards (see Section 13, Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS: Avoid release to the environment. Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

REFERENCE TO OTHER SECTIONS: See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: All employees who handle this material should be trained to handle it safely. 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. Keep away from heat, sparks, and other sources of ignition. Keep container tightly closed when not in use. Use non-sparking tools.

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). 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. 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 primer.

8. EXPOSURE CONTROLS – PERSONAL PROTECTION

EXPOSURE LIMITS:

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVS		OSHA-PELS		NIOSH-RELS		NIOSH	OTHER
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	ppm
Methyl Ethyl Ketone	78-93-3	200	300	200	NE	200	300	NE	CANADA: BC, QB: TWA=50; STEL=100 Other Provinces, Territories: see ACGIH
Isophorone Diisocyanate	4098-71-9	0.005	NE	100	NE	0.005	0.02	75	CANADA: BC: TWA=0.005; Ceiling Limit Value =0.01 ON: TWA=0.005; Ceiling Limit Value =0.02 QB: TWA=0.005 Elsewhere: See ACGIH
Methylene Diphenyl Diisocyanate (MDI)	101-68-8	0.005	NE	NE	0.2 (ceiling)	0.005	0.02 (ceiling, 10 min.)	75	CANADA: BC: TWA=0.005; Ceiling Limit Value =0.01 ON: TWA=0.005; Ceiling=0.02 QB: TWA=0.005 Elsewhere: See ACGIH

NE = Not Established.

CONTROL PARAMETERS:

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
Methyl Ethyl Ketone • MEK in Urine	• End of Shift	• 2 mg/L

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Use a mechanical fan or vent area to outside. 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.

PROTECTIVE EQUIPMENT: The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR1910.132), equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02, Z94.3-M1982, *Industrial Eye and Face Protectors* and CSA Standard Z195-02, *Protective Footwear*). 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 U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, or the Canadian CSA Standard Z94.4-02. The following are NIOSH respiratory protection recommendations are for the Ethyl Acetate and Methyl Ethyl Ketone components in air.

METHYL ETHYL KETONE

CONCENTRATION — RESPIRATORY PROTECTION

Up to 3000 ppm: Any SAR operated in a continuous-flow mode, any PAPR with organic vapor cartridge(s), any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s), any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, any SCBA with a full facepiece, or any SAR with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister or any appropriate escape-type, SCBA.

8. EXPOSURE CONTROLS – PERSONAL PROTECTION, continued

PROTECTIVE EQUIPMENT (continued):

EYE PROTECTION: If necessary, refer to U.S. OSHA 29 CFR 1910.133 or Canadian CSA Standard Z94.3-07, for further information.

HAND PROTECTION: Due to Nitrile's poor resistance to methyl ethyl ketone, it is not recommended as a glove material for use with this product. If nitrile gloves are worn, they must be removed immediately if contact with this product occurs. NOTICE: The selection of a specific glove for a particular application and duration of use should take into account all relevant workplace factors. For example: other chemicals which may be handled; physical requirements (cut and puncture protection, dexterity, thermal protection); potential allergic skin or mucous membrane reactions to glove materials; as well as the instructions/specifications provided by the glove supplier, should be considered.

Polyvinyl alcohol, polyethylene/ethylene vinyl alcohol, 4H™, Barricade™, or Responder™ gloves are acceptable. 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 the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada.

HYGIENE: See Section 7.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.

COLOR: Black.

MOLECULAR FORMULA: Mixture.

MOLECULAR WEIGHT: Mixture.

ODOR: Fruity.

ODOR THRESHOLD: Not established for product.

pH: Not established for product.

MELTING/FREEZING POINT: Not established for product.

BOILING POINT: 80°C (176°F)

FLASH POINT: - 10°C (14°F)

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

LOWER FLAMMABLE LIMIT (in air by volume, %): 0.8%

UPPER FLAMMABLE LIMIT (in air by volume, %): 11.5%

AUTOIGNITION TEMPERATURE: 400°C (752°F).

VAPOR PRESSURE: 15 kPa (150 mbar)

RELATIVE VAPOR DENSITY (air = 1): 2.5

SPECIFIC GRAVITY (water = 1): 0.95

SOLUBILITY IN WATER: Not established for product.

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

AUTOIGNITION TEMPERATURE: Not established.

VISCOSITY (cP): Not established.

10. STABILITY AND REACTIVITY

REACTIVITY: Not considered a reactivity hazard.

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

DECOMPOSITION PRODUCTS: *Combustion:* The products of thermal decomposition of this material include irritating vapors and toxic gases (e.g., carbon dioxide, carbon monoxide, nitrogen oxides, hydrogen cyanide). *Hydrolysis:* Carbon dioxide.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with strong oxidizing agents, mixtures of haloforms (e.g. chloroform) and strong bases, strong acids, water, amines, alcohols, acids, bases. Reactions with alcohols and amines can be exothermic.

POSSIBILITY OF 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

INFORMATION ON TOXICOLOGICAL EFFECTS

ACUTE TOXICITY: Not Classified.

Data for Methylene Diphenyl Diisocyanate:
LD50 (Oral-Rat) 9200 mg/kg: Behavioral: somnolence (general depressed activity), ataxia; Nutritional and Gross Metabolic: body temperature decrease
LD50 (Oral-Mouse) 2200 mg/kg
LC50 (Inhalation-Rat) 178 mg/m3

Data for Carbon Black:
LD50 (Oral-rat) > 15400 mg/kg; Behavioral: somnolence (general depressed activity)
LD50 (Skin-rabbit) >3 g/kg

SKIN CORROSION/IRRITATION: Not Classified.

Data for Methylene Diphenyl Diisocyanate:
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours

Data for Methyl Ethyl Ketone
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Moderate
Standard Draize Test (Skin-Rabbit) 402 mg/24 hours: Mild
Open Irritation Test (Skin-Rabbit) 14 mg/24 hours: Mild

SERIOUS EYE DAMAGE/IRRITATION: Eye Irritation, Category 2A.

Data for Methylene Diphenyl Diisocyanate:
Standard Draize Test (Eye-Rabbit) 100 mg: Moderate

Data for Methyl Ethyl Ketone
Standard Draize Test (Eye-Rabbit) 80 mg
Standard Draize Test (Eye-Human) 350 ppm

RESPIRATORY SENSITIZATION: Respiratory Sensitization, Category 1.

Data for Methylene Diphenyl Diisocyanate:
OECD-GD 39 (Inhalation-rat): Sensitizing

SKIN SENSITIZATION Skin Sensitization, Category 1.

From Executive Summary included with REACH (EU chemicals regulation) Registration Dossier:
The human data (together with the animal data) for skin sensitization for 956 chemical substances were summarized and evaluated by Schlede et al. (2003, Toxicology 193, 219-259). For MDI this joint and reproducible approach for potency ranking indicated that in relation to a relatively high exposure, a relatively low but substantial incidence of allergic contact dermatitis exists. In agreement with the definitions given in chapter 3.4 of the 4thedition of the UN-GHS this would indicate classification as skin sensitization Sub-category 1B.

11. TOXICOLOGICAL INFORMATION, continued

GERM CELL MUTAGENICITY: Not Classified.

CARCINOGENICITY: Category 2.

The components of this product are listed by agencies tracking potential carcinogenic effects, as follows:

CARBON BLACK: ACGIH-TLV A4 (Not Classifiable as a Human Carcinogen); IARC-2B (Possibly Carcinogenic to Humans); MAK-3 (Substances that Cause Concern that They Could Be Carcinogenic for Man but Which Cannot Be Assessed Conclusively Because of Lack of Data); NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization)

METHYLENE DIPHENYL DIISOCYANATE: EPA-CBD (Cannot Be Determined); IARC-3B (Substances for Which in vitro Tests or Animal Studies Have Yielded Evidence of Carcinogenic Effects That is Not Sufficient for Classification of the Substance in One of the Other Categories – see IARC Monograph 71, page 1056); MAK3B (Substances Which Cause Concern That They Could Be Carcinogenic for Man, But Which Cannot Be Assessed Conclusively Because of Lack of Data.)

REPRODUCTIVE TOXICITY: Not Classified.

Data for Methylene Diphenyl Diisocyanate:

TCLo (Inhalation-Rat) 8 mg/m3/6 hours: Lungs, Thorax, or Respiration: respiratory depression; Skin and Appendages: cutaneous sensitization, experimental (after topical exposure); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TCLo (Inhalation-Rat) 20 mg/m3/6 hours: Lungs, Thorax, or Respiration: changes in lung weight, other changes

TCLo (Inhalation-Rat) 2.4 mg/m3/6 hours: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): lipids including transport

TCLo (Inhalation-Rat) 0.7 mg/m3/6 hours: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, other changes; Biochemical: Metabolism (Intermediary): other proteins

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE): STOT SE Category 3.

Data for Methyl Ethyl Ketone:

TCLo (Inhalation-Mouse) 4000 ppm/6 minutes: Lungs, Thorax, or Respiration: respiratory depression

TCLo (Inhalation-Guinea Pig) 30,000 mg/m^3/2 minutes: Sense Organs and Special Senses (Eye): conjunctive irritation; Lungs, Thorax, or Respiration: cough

SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE): Not Classified.

Data for Carbon Black:

TCLo (Inhalation-rat) 50 mg/m^3/6 hours/90 days-intermittent; Lungs, Thorax, or Respiration: other changes.

TCLo (Inhalation-rat) 11600 μg/m3/18 hours/2 years-intermittent; Tumorigenic: Carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors

ASPIRATION HAZARD: Not Classified.

SYMPTOMS/EFFECTS:

INHALATION: If high concentrations of vapors of this product are inhaled (as may occur if this material is used in a poorly ventilated area), symptoms of central nervous system depression may occur (e.g., headaches, dizziness, nausea, incoordination, light-headedness, and drowsiness). Inhalation of high concentration of vapors may be fatal from central nervous system. Additionally, irritation may cause irritation of the nose, throat and respiratory system, especially if inhalation exposure is prolonged. Symptoms may include coughing, sneezing and difficulty breathing. Congestion of the upper respiratory tract, spleen and kidney and hemorrhaging in lung tissue may occur Isocyanate compound vapors or aerosols may cause respiratory tract irritation, possibly severe enough to produce bronchospasm and pulmonary edema. Pulmonary sensitization and asthmatic reactions, ranging in severity from minor difficulty breathing to an acute attack, may also occur. Once sensitized, susceptible individuals may experience allergic reaction after exposure to very low levels of the product. Possible neurological symptoms from isocyanate exposure may include headache, insomnia, euphoria, ataxia, anxiety neurosis, depression, and paranoia. Gastrointestinal disturbances may include nausea, vomiting, abdominal pain. Chronic exposure to this product via inhalation may aggravate existing symptoms of bronchitis and emphysema.

11. TOXICOLOGICAL INFORMATION, continued

SYMPTOMS/EFFECTS (continued):

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. This product contains potential skin sensitizers. Susceptible individuals may experience allergic reaction after exposure to this product, including itching, eczema, welts and other reaction. Direct contact with the eyes can be moderately to severely irritating and will result in immediate pain, tearing. Redness, itching, burning sensation and visual disturbances may indicate excessive eye contact. Vapors of the product may cause watering and irritation of the eyes.

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 and symptoms of central nervous system depression, such as described under "Inhalation". 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.

SKIN ABSORPTION: No component of this product is known to be absorbed via intact skin.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ECOTOXICITY: This product has not been tested for ecotoxicity. The following aquatic toxicity data are available for some components of this product:

METHYL ETHYL KETONE:

EC_0 (*Pseudomonas putida* bacteria) 16 hours = 1,150 mg/L
EC_0 (*Microcystis aeruginosa* algae) 7 days = 110 mg/L
EC_0 (*Scenedesmus quadricauda* green algae) 8 days = 4,300 mg/L
EC_0 (*Entosiphon sulcatum* protozoa) 72 hours = 190 mg/L
EC_0 (Uronema parduczi Chatton-Lwoff) 2,830 mg/L
LD_0 (*Pseudomonas* bacteria) 2,500 mg/L
LD_0 (Scenedesmus algae) 12,500 mg/L
LD_0 (Colpoda protozoa) 5,000 mg/L
LC_{50} (mosquito fish) 24-96 hours = 5,600 mg/L
LC_{50} (bluegill) 24-96 hours = 5,640–1,690 mg/L
LC_{50} (goldfish) 24 hours = 5,000 mg/L

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

METHYL ETHYL KETONE:

Based on an experimental vapor pressure of 91 mm Hg at 25°C, Methyl Ethyl Ketone is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase Methyl Ethyl Ketone is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals with an estimated atmospheric half-life of about 14 days. This compound is also expected to undergo photolysis in the atmosphere by natural sunlight. Photochemical degradation of Methyl Ethyl Ketone by natural sunlight is expected to occur at approximately 1/5 the rate of degradation by photochemically produced hydroxy radicals. Methyl Ethyl Ketone is expected to have very high mobility in soils based upon measured K_{oc} values of 29 and 34 obtained in silt loams. Volatilization from dry soil surfaces is expected based upon the vapor pressure of this compound. Volatilization from moist soil surfaces is also expected based upon the measured Henry's Law constant of 4.7X10-5 atm-cu m/mol. The volatilization half-life of Methyl Ethyl Ketone from silt and sandy loams was measured as 4.9 days. This compound is expected to biodegrade under aerobic and anaerobic conditions. In water, Methyl Ethyl Ketone is not expected to adsorb to suspended solids or sediment based upon its measured K_{oc} values. Volatilization from water surfaces is expected to be an important environmental fate process given its Henry's Law constant. Estimated half-lives for a model river and model lake are 19 and 197 hours, respectively.

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

METHYL ETHYL KETONE:

An estimated BCF value of 1 was calculated for Methyl Ethyl Ketone, using an experimental log K_{ow} of 0.29 and a recommended regression-derived equation. According to a classification scheme, this BCF value suggests that bioconcentration in aquatic organisms is low.

MOBILITY: This product has not been tested for mobility in soil. The following information is available for some components.

METHYL ETHYL KETONE:

Measured K_{oc} values of 29 and 34 were obtained for Methyl Ethyl Ketone in silt loams. Based on a recommended classification scheme, Methyl Ethyl Ketone is expected to have very high mobility in soil.

OTHER ADVERSE EFFECTS: Components of this product are not listed as having ozone depletion potential.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

RESULTS OF PBT and vPvB ASSESSMENT: No data available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

13. DISPOSAL CONSIDERATIONS

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

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

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

EPA WASTE NUMBER: Wastes of this product should be tested to see if they meet waste criteria for D001, Characteristic-Ignitability, and D035 (wastes containing Methyl Ethyl Ketone).

14. TRANSPORTATION INFORMATION

UN NUMBER
1139

UN PROPER SHIPPING NAME
COATING SOLUTION

TRANSPORT HAZARD CLASS(ES)
3 (Flammable)

PACKING GROUP
II

ENVIRONMENTAL HAZARDS
This product does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN); components are not specifically listed in Annex III under MARPOL 73/78.

SPECIAL PRECAUTIONS FOR USER

IMDG:	EMS: F-E, S-E	Limited Quantities: 5 L	
IATA:	Cargo Aircraft:	Maximum quantity: 60 L	Packaging instructions: 364
	Passenger Aircraft:	Maximum quantity: 5 L	Packaging instructions: 353
		Special Instructions: A3	

TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL 73/78 AND THE IBC CODE
Not applicable to shipments of this product.

15. REGULATORY INFORMATION

U.S. STATE AND FEDERAL REGULATIONS:
U.S. SARA REPORTING REQUIREMENTS: The components of this product is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

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

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

U.S. CERCLA REPORTABLE QUANTITY (RQ): Methyl Ethyl Ketone = 5000 lb (2270 kg);

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

15. REGULATORY INFORMATION, continued

OTHER U.S. FEDERAL REGULATIONS:

METHYL ETHYL KETONE:

CLEAN AIR ACT: 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. Methyl Ethyl Ketone is included on this list.

CERCLA: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5000 lb or 2270 kg. The toll-free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Carbon Black component is on the Proposition 65 lists, but only when in airborne particles of respirable size.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN WHMIS CLASSIFICATION AND LABELING: See Section 2.

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

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

CHEMICALS MANAGEMENT PLAN:
Methyl Ethyl Ketone (78-93-3) and Ethyl Acetate (141-78-6) are part of the National Pollutants Release Inventory.

LIST OF TOXIC SUBSTANCES: No components of this product are on the List of Toxic Substances.

VIRTUAL ELIMINATION LIST: No components of this product are on the Virtual Elimination List.

16. OTHER INFORMATION

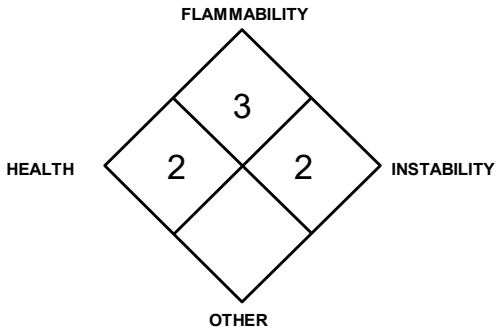
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REVISION DETAILS:

December 2019: First Edition.
July 2020: Company name change.
January 2021: Update glove selection recommendations in Section 8.

NFPA RATING



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

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	2*
FLAMMABILITY HAZARD (RED)	3
PHYSICAL HAZARD (YELLOW)	2

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

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.

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 a there is a danger of cutaneous absorption.

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

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

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

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

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

HEALTH HAZARD: 0 (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation*: Essentially non-irritating. PII or Draize = "0". *Eye Irritation*: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD_{50} Rat*: < 5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC_{50} 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 LD_{50} Rat*: > 500-5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 1000-2000 mg/kg. *Inhalation Toxicity LC_{50}* 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 LD_{50} Rat*: > 50-500 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 200-1000 mg/kg. *Inhalation Toxicity LC_{50} 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 LD_{50} Rat*: > 1-50 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 20-200 mg/kg. *Inhalation Toxicity LC_{50} 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 LD_{50} Rat*: ≤ 1 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: ≤ 20 mg/kg. *Inhalation Toxicity LC_{50} 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]).

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD: 0 (*Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. Unstable *Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No "0" rating allowed. *Unstable Reactives*: Substances that will not polymerize, decompose, condense or self-react.); **1** (*Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives*: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); **2** (*Water Reactivity*: Materials that may react violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); **3** (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group I Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3.:2 potassium bromate/cellulose mixture. Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion. **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 LC_{50} for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD_{50} 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 LC_{50} for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD_{50} 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 LC_{50} for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} 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 LC_{50} for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD_{50} for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: 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.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

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

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **N**ational **F**ire **P**rotection **A**ssociation (**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: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - 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. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration. **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.