SAFETY DATA SHEET

Prepared to U.S. OSHA and Canadian WHMIS Standards

DATE OF PREPARATION: December 3, 2019
REVISION DATE: January 12, 2021

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

IDENTIFICATION of the SUBSTANCE or PREPARATION:

TRADE NAME (AS LABELED): **SRP Velocity 60**
PRODUCT CODE(S): 1950, 1951

RELEVANT USES of the SUBSTANCE: Automotive Glass Polyurethane Adhesive
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

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:
Carcinogenic, Category 2
Respiratory Sensitizer, Category 1
Skin Sensitizer, Category 1

LABEL ELEMENTS:
Signal Words: Danger

Hazard Statements:
H351: Suspected of causing cancer.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317: May cause an allergic skin reaction.

Precautionary Statements:

Prevention:
- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P261: Avoid breathing dust/vapors.
- 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.
- P302+P352: IF ON SKIN: Wash 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 advice/attention.
- P304+P341: IF INHALED: 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 doctor/physician.
- P363: Wash contaminated clothing before reuse.

Storage:
- P405: Store locked up.

Disposal:
- P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

2. HAZARD IDENTIFICATION, continued

Hazard Symbols/Pictograms: GHS08, GHS07 (only GHS08 on label)

3. COMPOSITION and INFORMATION ON INGREDIENTS

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

CHEMICAL NAME	CAS #	% w/w	**OSHA/WHMIS Classification Hazard Statement and Pictogram Codes**
Methylene Diphenyl Diisocyanate (MDI)	101-68-8	0.7 - 1%	PUBLISHED CLASSIFICATION: Classification: Carcinogenic Category 2, Acute Toxicity Category 4, Eye Irritant Category 2A, Skin Irritant Category 2, Respiratory Sensitizer Category 1, Skin Sensitizer Category 1, STOT RE 2, STOT SE 3 Hazard Codes: H351, H332, H319, H315, H334, H317, H373, H335 Pictogram(s): GHS08
Hexamethylene-1,6-Diisocyanate Homopolymer	28182-81-2	4.5 - 5%	PUBLISHED CLASSIFICATION: Classification: Acute Toxicity Category 4, STOT SE 3, Skin Sensitizer Category 1 Hazard Codes: H332, H335, H317 Pictogram(s): GHS07
Carbon Black	1333-86-4	*	SELF CLASSIFICATION: Classification: Carcinogenic Category 2 Hazard Codes: H351 Pictogram(s): GHS08
Diisononyl Phthalate Ester	28553-12-0	*	Classification: Not Applicable

* 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 MEDIA: 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.

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

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

Explosion Sensitivity to Mechanical Impact: Not applicable.
Explosion Sensitivity to Static Discharge: May be sensitive to static discharge.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: 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

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. 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 USE

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.

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.

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 mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Carbon Black	1333-86-4	3.5	NE	3.5	NE	3.5 (0.1 in presence of Polycyclic Aromatic Hydrocarbons; 10-hr TWA)	NE	NE	CANADA: ON: 3 (inhalable fraction) Elsewhere: see ACGIH
Diisononyl Phthalate Ester	28553-12-0	NE	NE	NE	NE	NE	NE	NE	NE
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
Hexamethylene-1,6-Diisocyanate Homopolymer	28182-81-2	NE	NE	NE	NE	NE	NE	NE	NE

NE = Not Established.

CONTROL PARAMETERS:

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

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) or equivalent standards of Canada. Please reference applicable regulations and standards for relevant details.*

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in table above, if applicable. If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134, respiratory PPE standards incorporated by reference, applicable State regulations, or Canadian CSA Standard Z94.4-93.

EYE PROTECTION: Safety glasses or goggles are recommended. 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: Nitrile, polyvinyl alcohol, polyethylene/ethylene vinyl alcohol, 4H™, Barricade™, or Responder™ gloves. Natural rubber, butyl rubber, neoprene, and polyvinyl chloride 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: If necessary, use body protection appropriate for task (e.g., Tyvek suit, overalls, rubber apron).

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Paste.

COLOR: Black.

MOLECULAR FORMULA: Mixture.

MOLECULAR WEIGHT: Mixture.

ODOR: Characteristic.

ODOR THRESHOLD: Not established for product.

pH: Not established for product.

MELTING/FREEZING POINT: Not established for product.

BOILING POINT: Not established for product.

FLASH POINT (Pensky-Martens Closed Tester): Not established for product.

EVAPORATION RATE (nBuAc = 1): Not established; based on ingredients the comparative evaporation rate is expected to be <1.

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

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

RELATIVE VAPOR DENSITY (air = 1): Not established; based on ingredients the relative vapor density is expected to be >1.

SPECIFIC GRAVITY (23°C, water = 1): 1.34

SOLUBILITY: Insoluble in water.

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

AUTOIGNITION TEMPERATURE: Not established for product.

VISCOSITY (cP): 280000 - 380000

10. STABILITY AND REACTIVITY

REACTIVITY: Product is not classed as a reactivity hazard.

CHEMICAL STABILITY: Stable under normal conditions of temperature and pressure.

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

INCOMPATIBLE MATERIALS: This product will attack some forms of rubber, plastics and coatings. Avoid contact with oxidizers, strong acids and strong bases.

POSSIBILITY OF HAZARDOUS REACTIONS: None known.

CONDITIONS TO AVOID: Contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

ACUTE TOXICITY: Not Classified.

Data for Methylene Diphenyl Diisocyanate:
LD_{50} (Oral-Rat) 9200 mg/kg: Behavioral: somnolence (general depressed activity), ataxia; Nutritional and Gross Metabolic: body temperature decrease
LD_{50} (Oral-Mouse) 2200 mg/kg
LC_{50} (Inhalation-Rat) 178 mg/m^3

Data for Carbon Black:
LD_{50} (Oral-rat) > 15400 mg/kg; Behavioral: somnolence (general depressed activity)
LD_{50} (Skin-rabbit) >3 g/kg

Data for Diisononyl Phthalate:
LD50 (Oral-Rat) 10000 mg/kg
LD50 (Skin-Rabbit) 3160 mg/kg
LC50 (Inhalation-Rat) > 4.4 mg/L /4 hours

SKIN CORROSION/IRRITATION: Not Classified.

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

Data for Diisononyl Phthalate:
Standard Draize Test (Skin-Rabbit): No irritation

SERIOUS EYE DAMAGE/IRRITATION: Not Classified.

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

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.

GERM CELL MUTAGENICITY: Not Classified.

Data for Diphenyl Methane Diisocyanate:
EU Method B.13/14 (Mutagenicity - Reverse Mutation Test Using Bacteria): Negative

CARCINOGENICITY: Carcinogenic 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.)

11. TOXICOLOGICAL INFORMATION, continued

REPRODUCTIVE TOXICITY: Not Classified.

Data for Diisononyl Phthalate:
TDLo (Oral-Rat) 10 gm/kg: female 6-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)
TDLo (Oral-Rat) 20 gm/kg: male 70 day(s) pre-mating; female 70 day(s) pre-mating - 21 day(s) post-birth: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Specific Developmental Abnormalities: hepatobiliary system; Effects on Newborn: growth statistics (e.g.%, reduced weight gain)
TDLo (Oral-Rat) 39 gm/kg: male 70 day(s) pre-mating; female 70 day(s) pre-mating: 21 day(s) post-birth: Reproductive: Specific Developmental Abnormalities: urogenital system
TDLo (Oral-Rat) 79 gm/kg: male 70 day(s) pre-mating; female 70 day(s) pre-mating: 21 day(s) post-birth: Reproductive: Specific Developmental Abnormalities: hepatobiliary system, urogenital system
TDLo (Oral-Rat) 109 mg/kg: Multi-generations: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Specific Developmental Abnormalities: hepatobiliary system
TDLo (Oral-Rat) 153 gm/kg: male 70 day(s) pre-mating; female 70 day(s) pre-mating: 3 week(s) post-birth: Reproductive: Effects on Newborn: live birth index (measured after birth), weaning or lactation index (e.g., # alive at weaning per # alive at day 4)
TDLo (Oral-Rat) 219 mg/kg: Multi-generations: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)
TDLo (Oral-Rat) 510 gm/kg: male 70 day(s) pre-mating; female 70 day(s) pre-mating: 3 week(s) post-birth: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain)

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

Data for Methylene Diphenyl Diisocyanate:
TCLo (Inhalation-Rat) 8 mg/m^3/6 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/m^3/6 hours: Lungs, Thorax, or Respiration: changes in lung weight, other changes
TCLo (Inhalation-Rat) 2.4 mg/m^3/6 hours: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): lipids including transport
TCLo (Inhalation-Rat) 0.7 mg/m^3/6 hours: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, other changes; Biochemical: Metabolism (Intermediary): other proteins

SPECIFIC TARGET ORGAN TOXICITY (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 AFTER EXPOSURE

INHALATION: Inhalation of high concentrations of vapors of this product, as may occur if this material is used in a poorly ventilated area, may cause immediate irritation of the respiratory system. If high vapor concentrations of this product occur, symptoms of central nervous system depression may occur (e.g., headaches, dizziness, nausea). Symptoms are generally alleviated upon breathing fresh air. Isocyanate compound vapors or aerosols may cause respiratory tract irritation, possible 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.

EYE OR SKIN CONTACT: Skin contact may cause reddening, discomfort, and irritation. Symptoms are generally alleviated upon rinsing. Components are potential skin sensitizers. Susceptible individuals may experience allergic reaction after exposure to this product, including itching, eczema, welts and other reaction. Prolonged or repeated skin contact may cause dermatitis (dry, red skin), skin discoloration, and hardening of the skin. Direct contact with the eyes and the liquid product will be irritating and will result in immediate pain, and tearing of the eyes. Vapors of the product may cause watering and irritation of the eyes. Conjunctivitis may occur if contact is prolonged or chronic.

11. TOXICOLOGICAL INFORMATION, continued

SKIN ABSORPTION: The Diisononyl Phthalate component of this product can be absorbed via intact skin, possibly causing depression of the central nervous system if a large enough area of the skin is involved and may carry of other toxic compounds into the system.

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.

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 the Diisononyl Phthalate component of this product:

DIISONONYL PHTHALATE:
NOEC (*Daphnia magna*) 504 hours = > 0.034 mg/L
LC_{50} (*Cyrindon varegatus*) 96 hours = > 0.52 mg/L
LC_{50} (*Ictalurus punctatus*) 96 hours = 420 µg/L
LC_{50} (*Leopomis microlophus*) 96 hours = 4670 µg/L
LC_{50} (*Onchorhynchus mykiss*) 96 hours = > 0.16 mg/L
LC_{50} (*Pimphales promelas*) 96 hours = > 0.19 mg/L
LC_{50} (*Leopomis microlophus*) 96 hours = > 0.17 mg/L
LC_{50} (*Pimphales promelas*) 96 hours = > 0.14 mg/L
EC_{50} (*Daphnia magna*) 48 hours = > 0.086 mg/L

DIISONONYL PHTHALATE (continued):
EC_{50} (*Mysidopsis bahia*) 96 hours = > 0.77 mg/L
EC_{50} (*Paratanytarus parthenogenica*) 96 hours = > 0.12 mg/L
EC_{50} (*Selenastrum capricornutum*) 96 hours = > 2.8 mg/L
HEXAMETHYLENE-1,6-DIISOCYANATE HOMOPOLYMER:
EC_{50} (*Scenedesmus sp.*) 72 hr = >1000mg/L
NOEC Chronic (*Danio rerio*) = >100mg/L
NOEC Chronic (*Daphnia magna*) = >100mg/L
DIPHENYLMETHANE-4,4'-DIISOCYANATE:
NOEC Chronic *(Desmodesmus subspicatus*) = 1640mg/L

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. The following data are available for the Diisononyl Phthalate component of this product:

DIISONONYL PHTHALATE:
Terrestrial Fate: Based on a recommended classification scheme, an estimated Koc value of 10,580, determined from a measured water solubility of 0.2 mg/L and a recommended regression-derived equation, indicates that Diisononyl Phthalate is expected to have no mobility in soil. Volatilization of Diisononyl Phthalate is expected from moist soil surfaces given an estimated Henry's Law constant of 1.49X10-6 atm-cu m/mole, determined from an experimental vapor pressure of 5.4X10-7 mm Hg at 25°C and the measured water solubility of 0.2 mg/L at 20°C; but this process may be considerably attenuated due to adsorption. Diisononyl phthalate is not expected to volatilize from dry soil surfaces based on the measured vapor pressure of this compound. Aqueous screening studies and die-away tests suggest that Diisononyl Phthalate may biodegrade in soil.

Aquatic Fate: Based on a recommended classification scheme, an estimated Koc value of 10,580, determined from a measured water solubility of 0.2 mg/L and a recommended regression-derived equation, indicates that Diisononyl Phthalate is expected to adsorb to suspended solids and sediment in water. Diisononyl Phthalate is expected to volatilize from water surfaces based on an estimated Henry's Law constant of 1.49X10-6 atm-cu m/mole, determined from an experimental vapor pressure of 5.4X10-7 mm Hg at 25°C and the measured water solubility of 0.2 mg/L at 20°C; but adsorption may severely attenuate this process. Estimated half-lives for a model river and model lake are 51 and 374, days respectively when adsorption is neglected. The volatilization half-life from a model pond is approximately 120 years when adsorption is considered. According to a classification scheme, an estimated BCF value of 1,500, from the measured water solubility, suggests that bioconcentration in aquatic organisms is high. Bioconcentration studies on other phthalate esters suggest that bioconcentration may be lower than indicated by the regression derived equations due to aquatic organisms' ability to metabolize phthalate esters. Screening studies and die-away tests indicate that Diisononyl Phthalate will biodegrade in the environment.

Atmospheric Fate: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, Diisononyl Phthalate, which has a measured vapor pressure of 5.4X10-7 mm Hg at 25°C, is expected to exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase Diisononyl Phthalate is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 16 hours. Particulate-phase Diisononyl Phthalate will be removed from the atmosphere by wet and dry deposition.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The following data are available for the Diisononyl Phthalate component of this product:

DIISONONYL PHTHALATE:
Bioconcentration: An estimated BCF value of 1,530 was calculated for Diisononyl Phthalate, using a measured water solubility of 0.2 mg/L and a recommended regression-derived equation. According to a classification scheme, this BCF value suggests that bioconcentration in aquatic organisms is high. Bioconcentration studies on other phthalate esters suggest that bioconcentration may be lower than indicated by the regression derived equations due to aquatic organisms' ability to metabolize phthalate esters.

MOBILITY: This product has not been tested for mobility in soil. The following data are available for the Diisononyl Phthalate component of this product:

DIISONONYL PHTHALATE:
Terrestrial Fate: Based on a recommended classification scheme, an estimated Koc value of 10,580, determined from a measured water solubility of 0.2 mg/L and a recommended regression-derived equation, indicates that Diisononyl Phthalate is expected to have no mobility in soil. Volatilization of Diisononyl Phthalate is expected from moist soil surfaces given an estimated Henry's Law constant of 1.49X10-6 atm-cu m/mole, determined from an experimental vapor pressure of 5.4X10-7 mm Hg at 25°C and the measured water solubility of 0.2 mg/L at 20°C; but this process may be considerably attenuated due to adsorption. Diisononyl phthalate is not expected to volatilize from dry soil surfaces based on the measured vapor pressure of this compound. Aqueous screening studies and die-away tests suggest that Diisononyl Phthalate may biodegrade in soil.

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

13. DISPOSAL CONSIDERATIONS

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

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 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: Not applicable.

14. TRANSPORTATION INFORMATION

THIS PRODUCT IS NOT HAZARDOUS GOODS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is NOT classified as dangerous goods under the criteria of the IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is NOT classified as dangerous goods under the criteria of the IMO.

MARINE POLLUTANT: The components of this product are not designated by the IMO to be Marine Pollutants.

15. REGULATORY INFORMATION

U.S. STATE AND FEDERAL REGULATIONS:

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

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Methylene Diphenyl Diisocyanate	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): Methylene Diphenyl Diisocyanate = 5000 lb (2270 kg). The Diisononyl Phthalate component, as a phthalate ester is a CERCLA Hazardous Substance although no specific CERCLA RQ has been assigned (https://www.epa.gov/epcra/consolidated-list-lists-under-epcracerclacaa-ss112r-june-2019-version).

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

OTHER U.S. FEDERAL REGULATIONS: The Diisononyl Phthalate (as a phthalate ester) component is designated as a Toxic Pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations (https://www.ecfr.gov/cgi-bin/text-idx?SID=15e352a79a295dd3e0f1699119f82c04&mc=true&node=se40.31.401_115&rgn=div8).

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

CARBON BLACK: *Airborne particles of respirable size* were added to the California Proposition 65 list on February 21, 2003. Not relevant for this product due to its paste nature.

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.

15. REGULATORY INFORMATION, continued

ADDITIONAL CANADIAN REGULATIONS:

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

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITY SUBSTANCES LISTS: No components of this product are included on the Priority Substances Lists.

CHEMICALS MANAGEMENT PLAN:
MDI (101-68-8) http://ec.gc.ca/ese-ees/default.asp?lang=En&n=14B737B2-1#toc164

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.

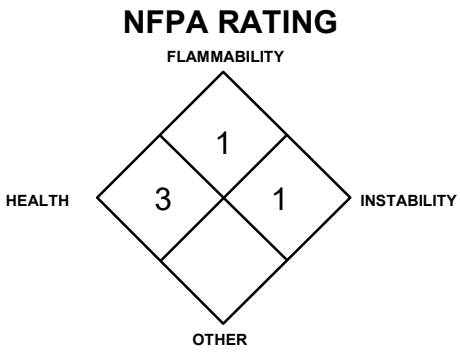
16. OTHER INFORMATION

PREPARED BY:

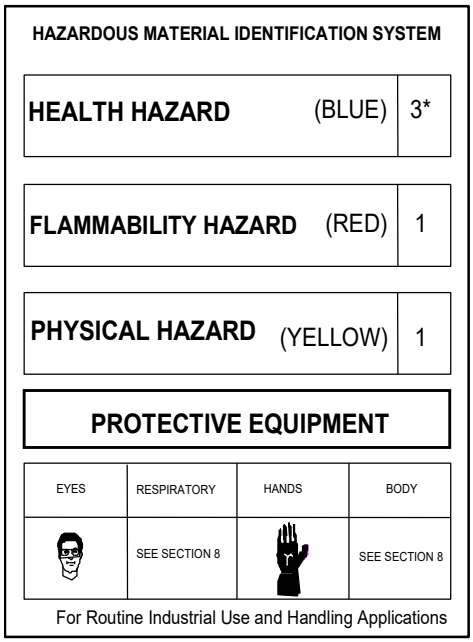
CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 1961, Hilo, HI 96721 • (800) 441-3365 • (808) 969-4846
SRP CHEMISTRY DEPARTMENT
650 Pelham Boulevard, Suite 100 • St Paul, MN 55114 (952) 944-8000

REVISION DETAILS:

December 2019: First edition.
July 2020: Formula change; new company name. Update all sections.
January 2021: Update glove selection recommendations in Section 8.



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



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

DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a SDS. 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.

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

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

LOQ: Limit of Quantitation.

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

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

NIC: Notice of Intended Change.

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

NIOSH RELs: NIOSH's Recommended Exposure Limits.

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

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

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

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

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

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

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

HEALTH HAZARD: 0 (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation*: Essentially non-irritating. PII or Draize = "0". *Eye Irritation*: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity 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]).

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. **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 up flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

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

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/m^3** 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.

REPRODUCTIVE TOXICITY INFORMATION:

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

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.

EUROPEAN and INTERNATIONAL:

The DFG: This is the Federal Republic of Germany's Occupation Health Agency, similar to the U.S. OSHA. **EU** is the European 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.