



# MATERIAL SAFETY DATA SHEET

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

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

### 1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED):** EXPRESS GUARD  
**CHEMICAL NAME/CLASS:** Aqueous Plate Surface Protector  
**PRODUCT USE:** Printing Operations  
**MANUFACTURER'S NAME:** REVERE GRAPHICS WORLDWIDE  
**ADDRESS:** 5 Boundary Street  
 Plymouth, MA 02360  
**EMERGENCY PHONE:** (800) 424-9300 (CHEMTREC)  
**BUSINESS PHONE:** (508) 746-1000  
**DATE OF PREPARATION:** February 4, 1999

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR BASED ON 8 HOUR TIME-WEIGHTED AVERAGES UNLESS OTHERWISE STATED					
			ACGIH		OSHA		IDLH mg/m <sup>3</sup>	OTHER
			TLV mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	PEL mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>		
Water Soluble Gum The following exposure limits, for "Particulates, Not Otherwise Classified", are recommended for evaluating occupational, inhalation exposure hazards.	9000-01-5	5-10	10 (Inhalable Fraction) 3 (Respirable Fraction)	NE	50 mppcf or 15 mg/m <sup>3</sup> (Total Dust) 15 mppcf or 5 mg/m <sup>3</sup> (Respirable Fraction)	NE	NE	NE
Water and other ingredients which are less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).		Balance	None of the other ingredients contribute additional, significant hazards to this mixture. All pertinent hazard information has been disclosed in the appropriate sections of this document.					

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

NOTE (2): Information on this product is being claimed as proprietary. All pertinent hazard information has been provided, per the Trade Secret requirements of U.S. Federal Occupational Safety and Health Administration Standards (29 CFR 1910.1200), Canadian WHMIS (CPR 12 and 19).

### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a clear, light-blue, odorless liquid. Emergency response to this product presents a potential health hazard via skin or eye contact, because the solution can mildly irritate contaminated tissue. The products of thermal decomposition include irritating vapors and toxic gases (e.g., carbon dioxide and carbon monoxide). This material is not reactive. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

**SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:**

The most significant routes of overexposure for this product are by inhalation of mists or contact with skin or eyes. The symptoms of overexposure are described in the following paragraphs.

**INHALATION:** If vapors, mists, or sprays of this solution are inhaled, they may irritate the nose and other tissues of the respiratory system may occur. Symptoms of such exposure can include watery nose and eyes, difficulty breathing, coughing, asthma, and bronchitis. The Water Soluble Gum component of this product is a respiratory sensitizer; after an initial exposure, subsequent exposures to small amounts can cause allergic reactions.

**CONTACT WITH SKIN OR EYES:** Eye contact with vapors and mists of this solution can cause redness, tearing, and mild to moderate irritation. Skin contact with the solution may cause redness, itching, irritation, hives, and eczema. The Water Soluble Gum component of this product is a skin sensitizer; after an initial exposure, subsequent exposures to small amounts can cause allergic reactions.

**SKIN ABSORPTION:** Skin absorption is not a significant route of overexposure to any component of this product.

**INGESTION:** Ingestion is not anticipated to be a significant route of occupational overexposure. In the unlikely event that this product is swallowed, it may cause nausea and vomiting. Symptoms similar to those described for inhalation exposure may also arise.

**INJECTION:** Injection of this product is not anticipated to be a significant route of exposure. If this product is injected via puncture with a contaminated object, it may cause irritation in addition to the wound. Symptoms similar to those described for inhalation exposure may also arise.

**TARGET ORGANS:** Skin, eyes.

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

**ACUTE:** Inhalation can cause watery nose and eyes, difficulty breathing, coughing, asthma, and bronchitis. Skin and eye contact can be irritating.



**CHRONIC:** The Water Soluble Gum component of this product is a respiratory and skin sensitizer; after an initial exposure, subsequent exposures to small amounts can cause allergic reactions. See Section 11 (Toxicology Information) for additional data on the components of this product.

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

### 4. FIRST-AID MEASURES

**SKIN EXPOSURE:** If this product contaminates the skin, begin decontamination with running water. Minimum flushing is for 15 minutes if redness or irritation develops. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The victim must seek medical attention if any adverse effect occurs.

**EYE EXPOSURE:** If vapors, mists, or sprays generated by this product enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	2
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			C/G
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For routine industrial applications			

**See Section 16 for Definition of Ratings**

## 4. FIRST-AID MEASURES (Continued)

**INHALATION:** If vapors, mists, or sprays generated by this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

**INGESTION:** Routine use of this product is not expected to cause any situation which could lead to ingestion. If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. 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.

Victims of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with victim.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):** Lower: Not applicable.  
Upper: Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Use fire extinguishing materials appropriate for surrounding fire.

Water Spray: Yes

Carbon Dioxide: Yes

Foam: Yes

Dry Chemical: Yes

Halon: Yes

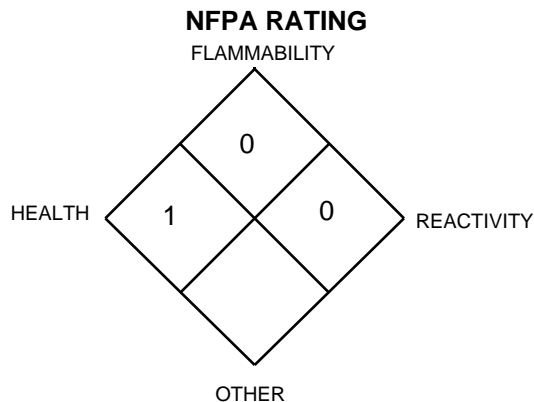
Other: Any "ABC" Class

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** When involved in a fire, this material decomposes to generate irritating vapors and toxic gases including carbon monoxide and carbon dioxide.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. All fire response equipment which may become contaminated with this material should be thoroughly decontaminated with water before being returned to service.



**See Section 16 for  
Definition of Ratings**

## 6. ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people.

In the event of a non-incident release (e.g., 10 gallons of material in which clean-up will generate excessive splashes and sprays), minimum Personal Protective Equipment should be gloves, goggles, appropriate body protection, and an air-purifying respirator with a dust/mist/fume filter. **Level B, which includes the use of Self-Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown.** Absorb spilled liquid with polypads, or other suitable absorbent material. Triple rinse with water. Decontaminate the area thoroughly. Decontaminate all response equipment with soapy water before returning to service. Place all spill residue in a suitable container and seal. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations).

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

## 7. HANDLING and STORAGE

**WORK AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after using this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors, mists, or sprays of this product. Remove contaminated clothing immediately.

## 7. HANDLING and STORAGE (Continued)

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care.

Store containers in a cool, dry location, away from direct sunlight, or sources of intense heat. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers. Keep container tightly closed when not in use. Storage areas should be made of fire resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

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

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Use a chemical fume hood or local exhaust ventilation, and process enclosure if necessary, to control airborne mists. Ensure eyewash/safety shower stations are available near areas where this product is used.

**RESPIRATORY PROTECTION:** Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134 or applicable State regulations. Air-purifying respirators with dust/mist/fume filters are recommended if operations may involve prolonged exposures to mists. Use supplied air respiration protection during emergency response operations

**EYE PROTECTION:** Safety glasses with side shields or goggles.

**HAND PROTECTION:** Wear neoprene or nitrile gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS.

**BODY PROTECTION:** Wear body protection appropriate for task (e.g., apron, lab coat, coveralls).

## 9. PHYSICAL and CHEMICAL PROPERTIES

**VAPOR DENSITY:** Vapors are heavier than air.

**EVAPORATION RATE (n-BuAc=1):** Similar to water.

**SPECIFIC GRAVITY:** Not established.

**MELTING POINT or RANGE:** Not established.

**SOLUBILITY IN WATER:** Miscible.

**BOILING POINT:** Approximately 100°C (212°F)

**VAPOR PRESSURE, mm Hg @ 20°C (68°F):** Similar to water.

**pH:** Not established.

**ODOR THRESHOLD (recognition):** Not established.

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

**APPEARANCE AND COLOR:** This product is a clear, light-blue, odorless liquid.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** The appearance may be a warning property of this product.

## 10. STABILITY and REACTIVITY

**STABILITY:** Stable.

**DECOMPOSITION PRODUCTS:** Thermal decomposition will produce mainly carbon monoxide and carbon dioxide.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Strong oxidizers and water-reactive materials.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Fire, extremely high temperatures, and contact with incompatible chemicals.

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

## 11. TOXICOLOGICAL INFORMATION

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

**WATER SOLUBLE GUM:**

Eye Irritancy (rabbit) = 36 mg/5 hours;  
severe effects

**WATER SOLUBLE GUM (continued):**

Dominant Lethal Test (oral, rat) = 54,600  
mg/kg/10 weeks/continuous

**WATER SOLUBLE GUM (continued):**

TDLo (oral, rat) = 350 g/kg/male 10 weeks pre;  
Reproductive effects

## 11. TOXICOLOGICAL INFORMATION (Continued)

### TOXICITY DATA (continued):

#### WATER SOLUBLE GUM (continued):

TDLo (oral, rat) = 1260 g/kg/13 weeks/continuous; Liver: changes in liver weight (continued in next column)

#### WATER SOLUBLE GUM (continued):

Kidney, Urethra, Bladder: changes in bladder weight; Blood: changes in serum composition (e.g., TP, bilirubin, cholesterol)

#### WATER SOLUBLE GUM (continued):

LD<sub>50</sub> (oral, rat) > 16 g/kg  
LD<sub>50</sub> (oral, mouse) > 16 g/kg  
LD<sub>50</sub> (oral, rabbit) = 8 g/kg  
LD<sub>50</sub> (oral, hamster) > 18 g/kg

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

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

SENSITIZATION TO THE PRODUCT: The water Soluble Gum component of this product is a respiratory and skin sensitizer; after an initial exposure, subsequent exposures to small amounts can cause allergic reactions.

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

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Animal mutation data are available for the Water Soluble Gum component of this product; these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans.

Reproductive Toxicity: This product is not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Water Soluble Gum component of this product provided reproductive toxicity data.

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.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Respiratory disorders, dermatitis, and other skin disorders may be aggravated by overexposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, ACGIH Biological Exposure Indices (BEIs) are not applicable to the components of this product.

## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product will slowly degrade under ambient environmental conditions to other organic compounds.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This solution is not anticipated to be harmful to animals. No information is currently available on this solution's potential impact on plant life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Releases of large quantities of this solution into the environment is not anticipated to be harmful to aquatic life.

## 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: 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.

EPA WASTE NUMBER: Not applicable to the product.

## 14. TRANSPORTATION INFORMATION

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

PROPER SHIPPING NAME: Not Applicable  
HAZARD CLASS NUMBER: Not Applicable  
UN IDENTIFICATION NUMBER: Not Applicable  
PACKING GROUP: Not Applicable  
DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 1996: Not Applicable

MARINE POLLUTANT: No component of this product is designated as a marine pollutant by the Department of Transportation (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS NOT CONSIDERED AS DANGEROUS GOODS.

## 15. REGULATORY INFORMATION

### ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: None of 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.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

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

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: The components of this product are not covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No.	Michigan - Critical Materials Register: No.	Pennsylvania - Hazardous Substance : No.
California - Permissible Exposure Limits for Chemical Contaminants: No.	Minnesota - List of Hazardous Substances: No.	Rhode Island - Hazardous Substance List: No.
Florida - Substance List: No.	Missouri - Employer Information/Toxic Substance List: No.	Texas - Hazardous Substance List: No.
Illinois - Toxic Substance List: No.	New Jersey - Right to Know Hazardous Substance List: Water Soluble Gum.	West Virginia - Hazardous Substance List: No.
Kansas - Section 302/312: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.	Wisconsin - Toxic and Hazardous Substances: No.
Massachusetts - Substance List: No.		

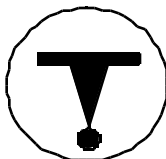
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 lists.

LABELING: **WARNING!** MAY CAUSE ALLERGIC RESPIRATORY OR SKIN REACTION. MAY CAUSE SKIN OR EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. Keep container closed. Use only with adequate ventilation. Do not breath vapors or mists. Avoid prolonged or repeated skin contact. Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling. Wear appropriate eye, hand, body, and body protection. **FIRST-AID:** In case of contact, immediately flush skin with plenty of water. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, foam, dry chemical, or CO<sub>2</sub>. **IN CASE OF SPILL:** Absorb spilled liquid with polypads. Avoid generation of mists. Consult Material Safety Data Sheet for additional information.

### ADDITIONAL CANADIAN REGULATIONS:

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

CANADIAN WHMIS SYMBOLS: **Class: D2B** (Materials Causing Other Toxic Effects)



## 16. OTHER INFORMATION

**PREPARED BY:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
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619/565-0302

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### DEFINITIONS OF TERMS

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

**CAS #** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

**EXPOSURE LIMITS IN AIR:**

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

**TLV** - Threshold Limit Value - an airborne concentration of a substance which 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 Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - 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 which was vacated by Court Order. **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. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

**HAZARD RATINGS:**

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** Health Hazard: **0**

(minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0**

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

Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

**FLAMMABILITY LIMITS IN AIR:**

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

**TOXICOLOGICAL INFORMATION:**

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<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - 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<sup>3</sup>** 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. Data from several sources are used to evaluate the cancer-causing potential of the material. 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 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. **BEI** - 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.

**REGULATORY INFORMATION:**

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