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**CHEMETALL FOOTE CORPORATION**  
**MATERIAL SAFETY DATA SHEET**

LITHIUM HYDROXIDE MONOHYDRATE

CFM 048

Page 1 of 7

**SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

CHEMETALL FOOTE CORPORATION  
348 HOLIDAY INN DRIVE  
KINGS MOUNTAIN, NC 28086  
704-739-2501 (8 AM - 5 PM M-F)

FOR EMERGENCY TRANSPORTATION  
INFORMATION, CALL CHEMTREC  
**1-800-424-9300**

**SUBSTANCE:** LITHIUM HYDROXIDE

**TRADE NAMES/SYNONYMS:** Lithium Hydroxide Hydrate; Lithium Hydroxide Hydrated; UN 2680; CFM12926

**PRODUCT CODES:** CFM 048

**CHEMICAL FAMILY:** Inorganic base

**FORMULAS:** LiOH•H<sub>2</sub>O

**CREATION DATE:** 4/11/96

**REVISION DATE:** 10/26/98

**SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

Component	CAS#	% w/w	Exposure Limits in Air				
			ACGIH		OSHA		OTHER
			TLV	STEL	PEL	STEL	
Lithium Hydroxide, Monohydrate	1310-66-3	> 99	NE	2 mg/m <sup>3</sup> C (for Sodium Hydroxide, a compound with similar hazard properties)	NE	2 mg/m <sup>3</sup> C (for Sodium Hydroxide, a compound with similar hazard properties)	NIOSH: REL: 2 mg/m <sup>3</sup> C IDLH: 10 mg/m <sup>3</sup>

NE = Not established. See section 16 for definition of other terms and acronyms used.

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

**SECTION 3 HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW:** This is a white, crystalline solid. Lithium hydroxide is caustic and can cause severe irritation and corrosive damage to the skin and eyes. Inhalation of this product's dusts can be severely irritating and damaging to the tissues of the nose, throat, and respiratory system. This product is not flammable. Emergency responders must wear personal protective equipment appropriate to the situation to which they are responding.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** In terms of anticipated occupational over-exposure situations for employees, the main health effect from over-exposure would be redness, severe irritation, and damage to contaminated skin and eyes (depending on the duration of the exposure).

**INHALATION:** Inhalation of this product's dust may severely irritate or damage the tissues of the eyes, nose, and respiratory system. Symptoms of such over-exposure can include coughing, sneezing, and a sore throat. Inhalation of relatively large quantities of this product may damage the tissues of the respiratory system, which can lead to the development of severe respiratory problems (i.e. breathing difficulty, chemical pneumonitis).

**CONTACT WITH SKIN or EYES:** Lithium Hydroxide is caustic and can cause severe irritation and corrosive damage to the skin and eyes. Corneal damage and blindness may result if this product contaminates the eyes. Deep burns which are slow to heal, and which leave scar tissue, may result after skin over-exposures.

**SKIN ABSORPTION:** Skin absorption is not a significant route of exposure for lithium hydroxide.

**SECTION 3 HAZARDS IDENTIFICATION (Continued)**

**INGESTION:** Though not anticipated to occur during routine occupational use situations, ingestion of this product can cause severe pain, burning of the mouth and throat, vomiting, and diarrhea. Severe ingestion over-exposures can cause collapse and death. In humans, ingestion of 10 grams of lithium hydroxide may be fatal. Vomiting, (which can occur after ingestion of this product) may lead to aspiration causing lung damage.

**INJECTION:** Over-exposure via injection of this product can lead to pain and irritation at the point of injection; additionally, symptoms such as those described for "Skin or Eye Contact" may develop.

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

**ACUTE:** In terms of occupational use situations, the chief health effect anticipated after over-exposure would be redness, severe irritation, or corrosive damage to contaminated skin and eyes. Ingestion of relatively large doses can be fatal. Inhalation of this product's dusts may severely irritate or damage the tissues of the eyes, nose, and respiratory system (leading to such symptoms as coughing, sneezing, and breathing difficulty).

**CHRONIC:** Dermatitis (cracking and reddening of the skin) may develop after prolonged or repeated skin contact with this product.

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATING:** Health Hazard = 3; Fire Hazard = 0; Reactivity Hazard Rating = 0; PPE Rating = C

**SECTION 4 FIRST-AID MEASURES**

**SKIN EXPOSURE:** If this product contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victims must seek immediate medical attention.

**EYE EXPOSURE:** If the product gets into the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victims must seek immediate medical attention.

**INHALATION:** If dusts of 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:** If chemical 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 who cannot swallow.

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

**SECTION 5 FIRE-FIGHTING MEASURES**

**FLASH POINT, °C (method):** Not applicable.

**AUTOIGNITION TEMPERATURE, °C:** Not applicable.

**FLAMMABLE LIMITS (in air by volume):** Not applicable.

**FIRE EXTINGUISHING MATERIALS:** This product is not flammable. Use fire extinguishing material appropriate for surrounding fires.

**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 may decompose and produce irritating fumes and toxic gases (lithium compounds).

**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 fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment.

**NFPA RATING:** Health Hazard = 3; Fire Hazard = 0; Reactivity Hazard Rating = 0.

**SECTION 6 ACCIDENTAL RELEASE MEASURES**

Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

The minimum Personal Protective Equipment recommended for response to non-incident releases should be **Level C: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and air-purifying respirator with high-efficiency particulate filter. Self-Contained Breathing Apparatus should be worn in situations where the oxygen level is below 19.5 % or is unknown.**

Sweep-up or vacuum spilled material carefully, avoiding the generation of dusts. Decontaminate the area thoroughly. Place all spill residue in a double plastic bag and seal. Dispose of in accordance with Federal, State, and local solid waste disposal regulations (see Section 13, Disposal Considerations).

**SECTION 7 HANDLING AND STORAGE**

**WORK PRACTICES AND HYGIENE PRACTICES:** Avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Avoid creating dusts of this product. Do not eat or drink while handling this product.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Avoid breathing dusts or particles generated by this product. Wash thoroughly after using this material. Ensure containers of this product are properly labeled. Open containers slowly, on a stable surface.

Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container tightly closed when not in use. Store away from incompatible materials. Inspect containers containing this product for leaks or damage. Read instructions provided with the product prior to use.

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely, as applicable. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment using soapy water before maintenance begins. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

**SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION**

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation. Mechanical exhaust may be needed. Emergency Eye Wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

**RESPIRATORY PROTECTION:** Respiratory protection is not generally needed when using this product. Maintain airborne contaminant concentrations below exposure limits 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. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown.

**EYE PROTECTION:** Splash goggles or safety glasses. Note: Additional protection, such as a face-shield, may be required for specific work-situations in which this product is used. The potential exposure hazards for each work situation must be evaluated, per 29 CFR 1910.132 (Federal OSHA Personal Protective Equipment Standard/General requirements), to determine the appropriate personal protective equipment for the operation.

**HAND PROTECTION:** Wear neoprene gloves for routine industrial use.

**BODY PROTECTION:** Use body protection appropriate for task (i.e. Apron or Tyvek suit).

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

**RELATIVE VAPOR DENSITY (air = 1):** Not applicable.

**SPECIFIC GRAVITY:** 1.5

**SOLUBILITY IN WATER:** 22.3 g/100mL @ 10 °C.

**VAPOR PRESSURE, mm Hg @ 20 °C:** Not applicable.

**ODOR THRESHOLD:** Not available.

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

**APPEARANCE AND COLOR:** White, crystalline solid.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** The product does not have any unique warning properties. Aqueous solutions of this product will turn litmus paper blue.

**EVAPORATION RATE (water=1):** Not applicable.

**FREEZING/MELTING POINT:** 450 °C (842 °F)

**BOILING POINT:** Not applicable.

**pH:** 14 (1.0 N Solution).

**SECTION 10 STABILITY AND REACTIVITY**

**STABILITY:** Relatively stable.

**DECOMPOSITION PRODUCTS:** Thermal decomposition of the components of this product include lithium compounds and caustic vapors.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** This product is not compatible with strong acids. Lithium hydroxide is corrosive to aluminum, lead, and zinc.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid mixing this product with incompatible chemicals.

**SECTION 11 TOXICOLOGICAL INFORMATION**

**TOXICITY DATA:** Additional toxicology information for lithium hydroxide is given below:

**Eye Irritation:** In animal tests, solutions of lithium hydroxide are similar to solutions of sodium hydroxide, which can cause severe corrosive eye damage.

**Short-Term Inhalation:** In one study, rats were exposed to an aerosol, which was primarily lithium hydroxide, but may have contained up to 25 percent lithium carbonate. The exposure was to 570-1500 mg/m<sup>3</sup> for four hours. The rats developed breathing difficulties and became less energetic.

In addition, they showed symptoms of severe irritation (coughing, choking, bleeding around the eyes and nose) and lost weight. Some rats died, especially at high concentration levels. Examination of the rats revealed lesions in the airways and lungs.

**SUSPECTED CANCER AGENT:** Lithium hydroxide is not found on the following lists: NTP, IARC, Federal OSHA Z List and CAL-OSHA and therefore is not considered to be, nor suspected to be, a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** This product is expected to cause severe irritancy and corrosive damage to the skin, eyes, and any other contaminated tissue.

**SENSITIZATION TO THE PRODUCT:** Lithium hydroxide is not known to be a sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:**

**Mutagenicity:** This product is not expected to cause mutagenic effects in humans.

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

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

**Reproductive Toxicity:** This product is not expected to cause reproductive effects in humans.

*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:** Pre-existing respiratory, skin, central nervous system, and kidney conditions can be aggravated by over-exposure to this product.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate over-exposure.

**BIOLOGICAL EXPOSURE INDICES:** Currently there are no Biological Exposure Indices (BEIs) associated with Lithium Hydroxide.

**SECTION 12 ECOLOGICAL INFORMATION**

**ENVIRONMENTAL STABILITY:** Lithium hydroxide is stable in the environment.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** Due to the corrosivity of lithium hydroxide, this product can be harmful or fatal to contaminated plants and animals. As with all chemicals, work practices should be aimed at minimizing environmental releases.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** Due to the corrosivity of lithium hydroxide, this product can be harmful or fatal to aquatic plants and animals in contaminated bodies of water.

**ACUTE AQUATIC TOXICITY:** No data available.

**DEGRADABILITY:** No data available.

**LOG BIOCONCENTRATION FACTOR (BCF):** No data available.

**LOG OCTANOL/WATER PARTITION COEFFICIENT:** No data available.

218

**SECTION 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 solid waste regulatory authority.

EPA WASTE NUMBER: D002 (Characteristic/Corrosive), applicable to wastes consisting of the product.

**SECTION 14 TRANSPORT INFORMATION**

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

<u>PROPER SHIPPING NAME:</u>	Lithium hydroxide, monohydrate
<u>HAZARD CLASS NUMBER and DESCRIPTION:</u>	8 (Corrosive)
<u>UN IDENTIFICATION NUMBER:</u>	UN 2680
<u>PACKING GROUP:</u>	II
<u>DOT LABEL(S) REQUIRED:</u>	Corrosive.

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 154

MARINE POLLUTANT: Lithium hydroxide is not designated as a DOT Marine Pollutant (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

INTERNATIONAL AIR TRANSPORT ASSOCIATION DANGEROUS GOODS REGULATIONS: Use the following information for international shipments via air transport.

<u>PROPER SHIPPING NAME:</u>	Lithium hydroxide, monohydrate
<u>HAZARD CLASS NUMBER and DESCRIPTION:</u>	8 (Corrosive)
<u>UN IDENTIFICATION NUMBER:</u>	UN 2680
<u>PACKING GROUP:</u>	II
<u>LABEL(S) REQUIRED:</u>	Corrosive

PACKING INSTRUCTIONS: Passenger Aircraft: 814.; Cargo Aircraft: 816

EMERGENCY RESPONSE CONTACT FOR AN INCIDENT DURING TRANSPORTATION:

CHEMTREC 1-800-424-9300 or 1-703-527-3887

**SECTION 15 REGULATORY INFORMATION**

SARA REPORTING REQUIREMENTS: Lithium hydroxide is subject to the reporting requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows:

<u>CERCLA SECTION 103 (40 CFR 302.4):</u>	NO
<u>SARA SECTION 302 (40 CFR 355.30):</u>	NO
<u>SARA SECTION 304 (40 CFR 355.40):</u>	NO
<u>SARA SECTION 313 (40 CFR 372.65):</u>	NO

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: Lithium hydroxide is listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER FEDERAL REGULATIONS: Not applicable.

**SECTION 15 REGULATORY INFORMATION**

**STATE REGULATORY INFORMATION:** Lithium Hydroxide, Monohydrate, is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: None  
 California - Permissible Exposure Limits for Chemical Contaminants: None.  
 Florida - Substance List: None  
 Illinois - Toxic Substance List: None.  
 Kansas - Section 302/313 List: None  
 Massachusetts - Substance List: None.  
 Minnesota - List of Hazardous Substances: None  
 Missouri - Employer Information/Toxic Substance List: None.

New Jersey - Right to Know Hazardous Substance List: Lithium Hydroxide, monohydrate.  
 North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.  
 Pennsylvania - Hazardous Substance List: None  
 Rhode Island - Hazardous Substance List: None.  
 Texas - Hazardous Substance List: None  
 West Virginia - Hazardous Substance List: None  
 Wisconsin - Toxic and Hazardous Substances: None

**CALIFORNIA PROPOSITION 65:** Lithium hydroxide is not on the California Proposition 65 lists.

**LABELING (Precautionary Statements):** **DANGER! CAUSES SEVERE EYE AND SKIN BURNS. HARMFUL IF INHALED.** Do not get in eyes or skin. Avoid breathing dust. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, face-shield and suitable body protection. **FIRST AID:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. If ingested, do not induce vomiting. Seek medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spilled product with inert material (i.e. polypads). Neutralize residue with neutralizer suitable for caustic materials. Place in a suitable container. Avoid contact with strong acids. Consult Material Safety Data Sheet before use.

**TARGET ORGANS:** Eyes, skin, mucous membranes.

**WHMIS SYMBOLS:** Corrosive (Class E). See Section 16 (Other Information).

**SECTION 16 OTHER INFORMATION**

REVISIONS - Corporation name, Section 14

The information in this Material Safety Data Sheet is based on data that Chemetall Foote Corporation believes to be reliable as of the MSDS's date of revision. Chemetall Foote Corporation makes no warranty or representation of any kind that the MSDS does not contain errors. The data in this MSDS relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Chemetall Foote Corporation, there are no warranties, expressed or implied, and Chemetall Foote Corporation assumes no liability in connection with the use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe on any patents. Any use of these data and information must be determined by the user to be in accordance with Federal, State and local laws and regulations.

**PREPARED BY:** CHEMICAL SAFETY ASSOCIATES, Inc.  
 9163 Chesapeake Drive, San Diego, CA 92123-1002  
 619/565-0302

**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**. Skin adsorption 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.

**FLAMMABILITY LIMITS IN AIR:**

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **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.

**SECTION 16 OTHER INFORMATION (Continued)**

**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 death. **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.

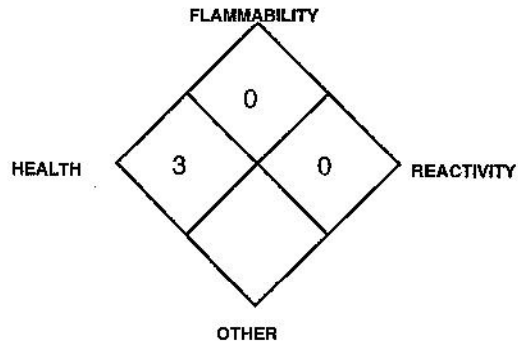
**REGULATORY INFORMATION:**

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 Transport Canada, respectively. The following laws are pertinent to the information presented in the MSDS: **Superfund Amendments and Reauthorization Act (SARA)**; the **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**. This section also includes information on the precautionary warnings which appear on the materials package label.

**GRAPHICAL REPRESENTATION OF HAZARDS**

**HAZARDOUS MATERIAL INFORMATION SYSTEM RATING      NATIONAL FIRE PROTECTION SYSTEM RATING**

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	3
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			D
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		
For routine industrial applications			



**WHMIS SYMBOL**

