

CROSSFIELD PRODUCTS CORPORATION

3000 E. Harcourt St
Rancho Dominguez, CA 90221 (Headquarters)
(310)-886-9100 (8:00 AM – 5:00 PM Pacific Time)

140 Valley Rd.
Roselle Park, NJ 07204
(908)-245-2800 (8:00 AM – 5: PM Eastern Time)

www.crossfieldproducts.com

MATERIAL SAFETY DATA SHEET

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **MiraGard Drylook Sealer**
CHEMICAL NAME/CLASS: Fluoro-modified Silsesquioxane
PRODUCT USE: Penetrating Sealer for concrete, cementitious overlays, natural stone, tile, and porcelain
SUPPLIER/MANUFACTURER'S NAME: **Crossfield Products Corp.**
ADDRESS (WEST COAST): 3000 E. Harcourt Street (Headquarters)
Rancho Dominguez, CA 90221
ADDRESS (EAST COAST): 140 Valley Rd.
Roselle Park, NJ 07204
EMERGENCY PHONE: **CHEMTREC: 800-424-9300**
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Si usted no entiende las Hojas de Informacion de Seguridad sobre Materials, busque a alguien para que se la explique a usted en detalle. (If you do not understand the Material Safety Data Sheet, find someone to explain it to you in detail.)

2. COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	%w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER mg/m ³
			TLV mg/m ³	STEL mg/m ³	PEL mg/m ³	STEL mg/m ³	IDLH mg/m ³	
Silsequioxanes, iso-Bu Me, methoxy	95823-37-3	7 - 13	NE	NE	NE	NE	NE	
Low Boiling Point Naptha	64742-48-9	1 - 5	NE	NE	NE	NE	NE	
Methanol	67-56-1	<0.5	200 ppm	250 ppm	200 ppm	250 ppm	NE	
Dibutyltin Dilaureate	77-58-7	<0.5	0.1 ppm	0.1ppm	0.1 ppm	0.1 ppm	NE	
Octamethylcyclotetrasiloxane	556-67-2	60 - 100	NE	NE	NE	NE	NE	
Water and other ingredients. The other ingredients are each present in less than 1 percent concentration in this product.		Balance	The components present in the balance of this product do not contribute any significant, additional hazards. All hazard information pertinent to this product has been presented in the remaining sections of this Material Safety Data Sheet, per the requirements of Federal Occupational Safety and Health Hazard Communication Standard (29 CFR 1910.1200).					
VOC Component = 282 g/L								

NE = Not Established. ND = No Data NA = Not Applicable 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.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear to pale yellow liquid solution. This solution is flammable, and can be damaging to contaminated tissue. Ingestion of large quantities can be fatal. In the event of fire or spill, adequate precautions must be taken. If involved in a fire, this product may decompose to produce toxic or irritating combustion products and a variety of other compounds (i.e. carbon monoxide and carbon dioxide). Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: This solution can damage skin, eyes, mucous membranes, and other contaminated tissue.

INHALATION: May cause respiratory tract irritation with symptoms of coughing, sore throat and runny nose. Inhalation of the solvents may cause central nervous system depression with symptoms of nausea, lightheadedness, drowsiness, dizziness, headache, numbness and loss of co-ordination. Prolonged occupational overexposure to solvents may cause liver, kidney, brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

CONTACT WITH SKIN: May cause irritation with symptoms of reddening and itching.

CONTACT WITH EYES: Causes irritation with symptoms of reddening, tearing, stinging, and swelling.

SKIN ABSORPTION: May cause irritation with symptoms of reddening and itching. Chronic: May cause defatting of the skin with symptoms of dryness and cracking.

INGESTION: Though ingestion is not anticipated to be a significant route of over-exposure to this product, if ingestion does occur it can result in nervous system effects which can include symptoms of dizziness, loss of co-ordination, headache, numbness, and/or confusion. Vomiting may cause aspiration of solvent resulting in chemical pneumonitis.

INJECTION: Though injection is not anticipated to be a significant route of over-exposure to this product, if it occurs, may cause local reddening, tissue swelling, and discomfort.

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

ACUTE: This solution can burn and damage eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty. Though unlikely to occur during occupational use, ingestion of large quantities may be fatal.

CHRONIC: Repeated skin contact with this product may result in dermatitis (inflammation and reddening of the skin), skin sensitization, and cause defatting of the skin with symptoms of dryness and cracking.

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

4. FIRST-AID MEASURES





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

EYE EXPOSURE: If this product enters 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. Oils or ointments should not be used at this time. Victim must seek immediate medical attention.

INHALATION: If vapors, mists, or sprays 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 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 1 – 2 glasses of water or milk. 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 health professional with victim.

Hazardous Material Information System			
HEALTH (Blue)		1	
FLAMMABILITY (Red)		3	
REACTIVITY (Yellow)		0	
PROTECTIVE EQUIPMENT		X	
EYES	RESP.	HANDS	BODY
 Safety Glasses	 Vapor Respirator	 Gloves	 Protective Apron
For Routine Industrial Applications			

5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): 49 °C (120 °F)

AUTOIGNITION TEMPERATURE, °C: ND

FLAMMABLE LIMITS (in air by volume, %, butyl acetate): Lower (LEL): 1.0%

Upper (UEL): 13%

FIRE EXTINGUISHING MATERIALS: (Class IIIB Combustible Liquid)

Water Spray: YES

Carbon Dioxide: YES

Foam: YES

Dry Chemical: YES

Halon: YES

Other: Any "ABC" Class.

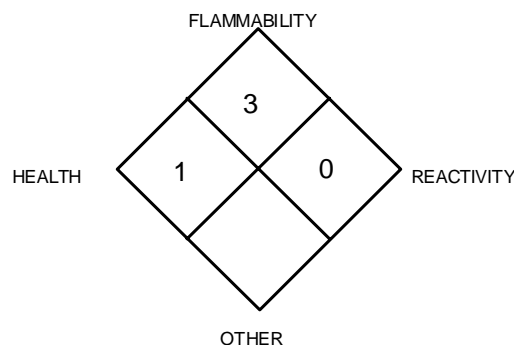
UNUSUAL FIRE AND EXPLOSION HAZARDS: May generate toxic or irritating combustion products, sudden reactions and fire may result if product is mixed with oxidizing agent. Solvent vapors may be heavier than air. Under conditions of stagnant air, vapors may build up and travel along the ground to an ignition source. If combined with phosphorus compounds, trimethylolpropanephosphate (TMPP), a known neurotoxin, can be given off in the event of a fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: 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 proper personal protective equipment for incidental releases (e.g.-1 L of the product released in a well-ventilated area) use impermeable gloves, specific for the material handled, goggles, face shield, and appropriate body protection. In the event of a large release, use impermeable gloves, specific for the material handled, chemically resistant suit and boots, and hard-hat. Self Contained Breathing Apparatus or respirator may be required where engineering controls are not adequate or conditions for potential exposure exist. When respirators are required, Select NIOSH/MSHA approved based on actual or potential airborne concentrations in accordance with latest OSHA and/or ANSI recommendations.

Absorb spilled liquid with inert material (e.g., dry sand or earth), polypads or other suitable absorbent materials. Shut off sources of ignition immediately. Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residue in metal containers for recovery or disposal. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations). Prevent entry into sewers, storm drains and waterways.

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

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Do not eat or drink while handling this material. Remove contaminated clothing immediately. Discard contaminated clothing items, or launder before re-use. Inform anyone handling such contaminated laundry of the hazards associated with this product. Use ventilation and other engineering controls to minimize potential exposure to this product.

STORAGE AND HANDLING PRACTICES: Keep away from oxidizers, heat or flame. Store in well-ventilated areas. Keep cool, dry and in closed containers.

For Non-Bulk Containers: Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers, or in a diked area, as appropriate. Store containers away from incompatible chemicals. Keep container tightly closed when not in use. Wash thoroughly after using this material. 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. Empty containers may contain residual liquid, therefore, empty containers should be handled with care.

Bulk Containers: All tanks and pipelines that contain this material must be labeled. Perform routine maintenance on tanks or pipelines that contain this product. Report all leaks immediately to the proper personnel.

Tank Car Shipments: Tank cars carrying this product should be loaded and unloaded in strict accordance with tank-car manufacturer's recommendation and all established on-site safety procedures. Appropriate personal protective equipment must be used (see Section 8, Engineering Controls and Personal Protective Equipment.). All loading and unloading equipment must be inspected, prior to each use. Loading and unloading operations must be attended, at all times. Tank cars must be level, brakes must be set or wheels must be locked or blocked prior to loading or unloading. Tank car (for loading) or storage tank (for unloading) must be verified to be correct for receiving this product and be properly prepared, prior to starting the transfer operations. Hoses must be verified to be clean and free of incompatible chemicals, prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions, before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blown-down and purged before disconnecting them from the tank car or vessel.

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. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment before maintenance. Begin by a triple-rinse with water followed, if necessary, with an additional rinse. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: If required use a corrosion-resistant ventilation system separate from other exhaust ventilation systems to ensure that there is no potential for overexposure to sprays, or mists of this product and that exposures are below those in section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: 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. If adequate ventilation is not available or if there is potential for airborne exposure above the exposure limits (listed in Section 2) a respirator may be worn up to respirator exposure limitations, check with respirator equipment manufactures recommendations/limitations. For a higher level of protection use positive pressure supplied air respiration protection or Self Contained Breathing Apparatus or if oxygen levels are below 19.5% or are unknown.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:

(Up to 1ppm) Positive pressure, full-facepiece Self Contained Breathing Apparatus; or positive pressure, full-facepiece Self Contained Breathing Apparatus with an auxiliary positive pressure Self Contained Breathing Apparatus.

EYE PROTECTION: Splash goggles or safety glasses. Face-shields are recommended when the operation can generate splashes, sprays or mists.

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

BODY PROTECTION: Use body protection appropriate for task. Long-sleeved shirts and trousers. Cover-all, rubber aprons, or chemical protective clothing made from natural rubber are generally acceptable, depending upon the task.

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): ND

SPECIFIC GRAVITY (water = 1): 0.95

SOLUBILITY IN WATER: None

VAPOR PRESSURE, mm Hg @ 50 °C: ND

ODOR THRESHOLD: ND

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

APPEARANCE AND COLOR: This is a clear to pale yellow liquid with a solvent odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): Not established.

EVAPORATION RATE (n-BuAc=1): ND

MELTING/FREEZING POINT: ND

BOILING POINT: >175 °C (347 °F)

pH: NA

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this solution can include carbon monoxide and carbon dioxide.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Acids, bases, and strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures and incompatible chemicals.

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Additional toxicology information for components greater than 1 percent in concentration is provided below.

Methanol (<0.5%)

Acute Oral LD₅₀ (rat) : > 5,000 mg/kg

Acute Dermal LD₅₀ (rat) : >5000 mg/kg

Acute Inhalation LC₅₀ (rat): 4345 ppm, vapor, 6 hrs.

Skin Irritation (rabbit): Non-irritating

NOAEL (rat): 300 ppm, 2 wks inhalation

LOAEL (rat): 1000 ppm, 2 wks inhalation

SUSPECTED CANCER AGENT: The components of this product does not contain 0.1% or more of any substance found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, 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 mildly irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: None.

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.

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.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that 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 that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently there are no Biological Exposure Indices (BEIs) associated with the components of this product.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Asthma and other respiratory disorders, skin allergies, eczema.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure to this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product are relatively stable in the environment; they may degrade, after time, into other organic and inorganic constituents.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product is harmful to plant and animal life if this product is released into the environment. As with all chemicals, work practices should be aimed at eliminating environmental releases.

EFFECT OF CHEMICAL ON AQUATIC LIFE This product is harmful to an aquatic environment and can be toxic to fish and aquatic plants. As with all chemicals, work practices should be aimed at eliminating environmental releases.

Methanol:

Biodegradation: Aerobic, 100%, Exposure time: 8 Days
Acute and Prolonged Exposure to Fish: LC50: 161 mg/l (Fathead minnow {Pimephales promelas}, 96 hrs)
Acute Toxicity to Aquatic Invertebrates: EC50: 408 mg/l (Water flea(Daphnia magna), 48 hrs)

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Incineration is a preferred method. 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: D001 (Characteristic, ignitability), applicable to wastes consisting only of this solution. When discarded in its purchased form, this product meets the criteria if ignitability, and should be managed as a hazardous waste under 40 CFR 261.

14. TRANSPORTATION INFORMATION

DOT:

Proper Shipping Name: Combustible Liquid N.O.S. (contains Propylene Glycol Monomethyl Ether Acetate)
UN Number: NA1993
Class: 3
Packing Group: III

**DOT Note: For quantities less than 110 gallons per container, this product ships as 'Not Regulated'.
(For Federal Express and UPS shipments, use the IATA / IMDG information.)**

IATA / IMDG:

Proper Shipping Name: Flammable Liquid N.O.S. (contains Propylene Glycol Monomethyl Ether Acetate)
UN Number: 1993
Class: 3
Packing Group: III

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 128

MARINE POLLUTANT: This product does not contain any components which are designated by the Department of Transportation to be Marine Pollutants. (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.

PASSENGER AIR MAX. QUANTITY: 60L
PASSENGER PACKING INSTRUCTIONS: 309
CARGO AIR – MAX. QUANTITY: 220L
CARGO AIR – PACKING INSTRUCTION: 310

Note: The latest DOT information is provided, please verify all DOT information as it subject to change without notice.

15. REGULATORY INFORMATION

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

COMPONENT	SARA 302	SARA 304	SARA 313
Methanol	No	No	Yes

SARA Threshold Planning Quantity: Not applicable.

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

DOT REGULATED COMPONENT (RQ): None

CERCLA REPORTABLE QUANTITY (RQ): None

OTHER FEDERAL REGULATIONS: Not applicable.

STATE REGULATORY INFORMATION: Components of this product are covered under specific State regulations, as denoted below:

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

<u>Weight %</u>	<u>Components</u>	<u>CAS No.</u>
None		

New Jersey Environmental Hazardous Substances List and/or New Jersey RTK Special Hazardous Substances Lists:



<u>Weight</u>	<u>Components</u>	<u>CAS No.</u>
None		

CALIFORNIA PROPOSITION 65: There are no components of this product that are known to the state of California to cause cancer, birth defects or other reproductive harm.

LABELING (Precautionary Statements): **DANGER!** FLAMMABLE MATERIAL! LIQUID AND MIST CAUSE SEVERE DAMAGE TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. MAY CAUSE LUNG DAMAGE. REACTS WITH WATER TO GENERATE HEAT. AVOID SPATTERING BY SLOWLY ADDING TO SOLUTION. Do not get into eyes, on skin or clothing. Avoid breathing spray or mist. Do not take internally. Use with adequate ventilation and employ respiratory protection when exposed to the mist or spray. When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing. Do not transfer to unlabeled containers. Use with adequate ventilation. Wash thoroughly after handling, Keep container closed when not in use. FIRST-AID: In case of contact, immediately flush skin or eyes for at least 15 minutes. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not induce vomiting. IN CASE OF FIRE: Use dry chemical, CO₂, or alcohol foam. IN CASE OF SPILL: Dike area to contain spill. Only trained personnel equipped full acid- protective gear should be permitted in this area. Spilled material may be absorbed into an appropriate absorbent material. Spills should be removed using a vacuum truck. Do not wash into storm or sanitary sewer system.

TARGET ORGANS: Skin, eyes, liver, kidney, and respiratory system.

WHMIS SYMBOLS: D2B

Class B - Flammable and Combustible Material	Class D - Poisonous and Infectious Material Division 2 Materials Causing Other Toxic Effect
	

16. OTHER INFORMATION

PREPARED BY:

Bill Beach
CROSSFIELD PRODUCTS CORP.

THIS INFORMATION IS DRAWN FROM RECOGNIZED SOURCES BELIEVED TO BE RELIABLE. CROSSFIELD PRODUCTS MAKES NO GUARANTEES NOR ASSUMES ANY LIABILITY IN CONNECTION WITH THIS INFORMATION. THE USER SHOULD BE AWARE OF CHANGING TECHNOLOGY, RESEARCH, REGULATIONS AND ANALYTICAL PROCEDURES THAT MAY REQUIRE CHANGES HEREIN. THE ABOVE DATA IS SUPPLIED UPON THE CONDITION THAT PERSONS WILL EVALUATE THIS INFORMATION AND THEN DETERMINE ITS SUITABILITY FOR THEIR USE.

DEFINITIONS OF TERMS

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

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

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association that 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.

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: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. 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 that 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 the Transport Canada, respectively. Other acronyms used are: **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)**; and various state regulations. This section also includes information on the precautionary warnings that appear on the materials package label.