CROSSFIELD PRODUCTS CORPORATION

www.crossfieldproducts.com

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

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**Electro-Flor Topcoat, Part B**
CHEMICAL NAME/CLASS:	Polyamine Solution
PRODUCT USE:	Decking Basecoat Curative
SUPPLIER/MANUFACTURER'S NAME:	Crossfield Products Corp.
ADDRESS: (West Coast):	3000 E. Harcourt St. Rancho Dominguez, CA 90221 (Headquarters)
ADDRESS: (East Coast):	140 Valley Rd. Roselle Park, NJ 07204
EMERGENCY PHONE:	**CHEMTREC**: 800-424-9300
DATE OF PREPARATION:	August 1st, 2023
REVISION DATE:	August 1st, 2023

2. HAZARD(S) IDENTIFICATION

Signal Word: (Danger)

GHS classification

Acute toxicity – Oral Category 4
Skin Corrosion – Category 2
Serious Eye Damage – Category 1
Skin sensitization – Category 1
Specific target organ toxicity-repeated exposure – Oral Category 2

Hazard Statements:
•H302: Harmful if swallowed
•H315: Causes skin irritation
•H317: May cause an allergic skin reaction
H318: Causes serious eye damage
H373a: May cause damage to organs through prolonged or repeated exposure if swallowed

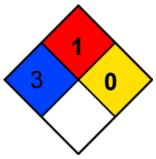
Precautionary Statements:
•P102: Keep out of reach of children
•P103: Read label before use
•P260 Do not breathe dust/fume/gas/mist/vapors/spray
•P264: Wash hands thoroughly after handling
•P280: Wear protective gloves/protective clothing/eye protection/face protection
•P301+P330+P331: IF SWALLOWED: rinse mouth. Do Not induce vomiting.
•P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water
•P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
•P310: Immediately call a POISON CENTER or doctor/physician
•P333+P313: If skin irritation or rash occurs: Get medical advice/attention
•P363: Wash contaminated clothing before reuse
•P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.

HMIS-RATINGS (SCALE 0 – 4)

HEALTH	3
FLAMMABILITY	1
REACTIVITY	0

Health = 3
Fire = 1
Reactivity = 0

NFPA RATING



EMERGENCY OVERVIEW:

For Routine Industrial Applications
SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of occupational overexposure is contact with skin. The symptoms of overexposure to this product are as follows:

EYE CONTACT: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Vapor may cause severe eye irritation. Vapor may cause lacrimation (tears).

INHALATION: Excessive exposure may cause irritation to upper respiratory tract (nose and throat). May cause central nervous system depression. Symptoms may include headache, dizziness and drowsiness, progressing to incoordination and unconsciousness. Prolonged excessive exposure may case serious adverse effects, even death.

CONTACT WITH SKIN: Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage. Prolonged skin contact is unlikely to result in absorption of harmful amounts. A component in this mixture has caused allergic skin reactions in humans. Contains component(s) which have caused allergic skin sensitization in guinea pigs.

INGESTION: Though ingestion is not anticipated to be a significant route of over-exposure to this product, if ingestion does occur, irritation of the mouth, throat, esophagus, and other tissues of the digestive system may occur upon contact.

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

ACUTE: Contact with this solution may cause irritation of the eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty
CHRONIC: Repeated skin contact with this product may result in dermatitis (inflammation and reddening of the skin).

3. COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			
			TLV mg/m^3	STEL mg/m^3	PEL mg/m^3	STEL mg/m^3	IDLH mg/m^3	OTHER mg/m^3
Benezenemethanol	100-51-6	30 - 60	NE	NE	NE	NE	NE	TWA: (WEEL) 10 ppm 44.2 mg/m^3
Methyleneoxide, polymer with benzenamine, hydrogenated	135108-88-2	30 - 60	NE	NE	NE	NE	NE	NE
4,4'-Methylenebiscyclohexanamine	1761-71-3	1 - 5	NE	NE	NE	NE	NE	NE
Organic Acid	NA	3 - 7	NE	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).					
Component VOC = 0 grams/liter								

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.

4. FIRST-AID MEASURES

SKIN EXPOSURE: For Skin contact, if available, wash with large amounts of running water and soap for 15 minutes. Remove contaminated clothing and shoes. Get immediate medical attention. Discard or decontaminate clothing before re-use, and destroy contaminated shoes.

EYE EXPOSURE: For eye contact, immediately flush eyes for at least 15 minutes with running water. Hold eyelids apart to ensure rinsing of the entire eye surface and lids with water. Get immediate medical attention.

INHALATION: If inhaled, remove from area to fresh air. If not breathing, give artificial respiration. Get immediate medical attention. If breathing is difficult, transport to medical care and, if available, give supplemental oxygen.

INGESTION: If swallowed, immediately give at least 3-4 glasses of water, but do not induce vomiting. If vomiting occurs, give fluids again. Do not give anything by mouth to an unconscious or convulsing person. Get immediate medical attention. Have physician determine whether vomiting or stomach evacuation is necessary.

NOTES TO PHYSICIAN: Maintain adequate ventilation and oxygenation of the patient. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): 103.89°C (219°F) Closed Cup
AUTOIGNITION TEMPERATURE, °C: ND
FLAMMABLE LIMITS (in air by volume, %):

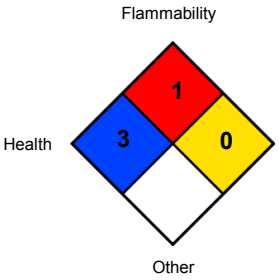
Lower (LEL): NE
Upper (UEL): NE

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES
Foam: YES
Halon: ND

Carbon Dioxide: YES
Dry Chemical: YES
Other: Any "ABC" Class.

NFPA RATING



UNUSUAL FIRE AND EXPLOSION HAZARDS: Run-off from fire control may cause pollution. Keep fire-exposed containers cool with water spray to prevent rupture due to excessive heat. High pressure water hose may spread product from broken containers increasing contamination. If involved in a fire, this product may decompose to produce a variety of compounds (i.e. carbon monoxide, carbon dioxide, aldehydes, nitrogen oxides and compounds). Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding. Products of combustion are irritating to the respiratory tract and may cause breathing difficulty. Symptoms may be delayed several hours or longer depending upon the extent of exposure.

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. Move fire-exposed containers, if it can be done without risk to firefighters. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas. If necessary, discard or decontaminate fire response equipment before returning such equipment to service.

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 polypads or other suitable absorbent materials. Neutralize residue with sodium bicarbonate and water rinse. Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residue in a suitable container. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations).

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: All employees who handle this material should be trained to handle it safely. Avoid breathing mists or sprays generated by this product. Use in a well-ventilated location.

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 which contain this material must be labeled. Perform routine maintenance on tanks or pipelines which 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 begins by a triple-rinse with water followed, if necessary, by using sodium bicarbonate and an additional rinse. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROL/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:

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 for spill response, as stated in Section 6 of this MSDS (Accidental Release Measures).

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

Safety Glasses

Safety Gloves

Synthetic Apron

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): ND
SPECIFIC GRAVITY (water = 1): 1.06
SOLUBILITY IN WATER: Slightly soluble.
VAPOR PRESSURE, mm Hg @ 20 °C: 0.7 mbar
ODOR : Amine
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

EVAPORATION RATE (n-BuAc=1): ND
MELTING/FREEZING POINT: Not established.
BOILING POINT: 222°C (432°F)
pH: Alkaline

APPEARANCE AND COLOR: Clear to hazy amber liquid
HOW TO DETECT THIS SUBSTANCE (warning properties): ND

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this solution can include a variety of compounds. (i.e. nitric acid, ammonia, nitrogen oxides, Carbon monoxide, carbon dioxide, Aldehydes, flammable hydrocarbon fragments, nitrosamine, organic acid vapors).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Avoid contact with Amines, incompatible with bases, reducing agents, reactive metals, materials reactive with hydroxyl compounds, organic acids, mineral acids, sodium hypochlorite, and oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur by itself.

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

11. TOXICALOGICAL INFORMATION

Likely routes of exposure

Effects on eye:	Causes eye burns
Effects on skin:	If absorbed through the skin, may cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Mild skin irritation. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Inhalation Effects:	May cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure.
Ingestion Effects:	Harmful if swallowed.

Acute toxicity

Acute Oral Toxicity:	LD50: 1,200 mg/kg (Rat)
Inhalation:	No data is available on the product itself.

Inhalation (Components)

Benzyl alcohol:	LC50 (4 h): >4.178 mg/l (Rat)	OECD Test Guideline 403

Acute Dermal Toxicity:	No data is available on the product itself.

Acute Dermal Toxicity (Components):

Benzyl alcohol	LD50: 2,000 mg/kg (Rabbit)
Methylenebiscyclohexanamine, 4,4'-	LD50: 2,110 mg/kg (Rabbit)
Methyleneoxide, Polymer with benzenamine, hydrogenated	LD50: >2,000 mg/kg (Rabbit) – estimated

Skin corrosion/irritation:	Mild irritant to the skin of a rabbit.
Serious eye damage/eye irritation:	Risk of damage to eyes
Sensitization:	May cause sensitization of susceptible persons by skin contact.

Chronic toxicity or effects from long term exposures

No Data

SUSPECTED CANCER AGENT: The major components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA in concentrations > 0.1 %; and are therefore not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is severely irritating and corrosive to contaminated tissue.

SENSITIZATION TO THE PRODUCT: Prolonged or repeated skin contact can result in the development of rashes, and other allergy-like symptoms.

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 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.

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

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Skin disorders can be aggravated by over-exposure to this product. Inhalation of this products mists may aggravate respiratory conditions.

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

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects

Aquatic toxicity: No data is available on the product itself.

Toxicity to fish (Components)

Benzyl alcohol	LC50 (96 h): 10 mg/l	Bluegill sunfish (Lepomis macrohirus)
Benzyl alcohol	LC50 (96 h): 480 mg/l	Fathead minnow (Pimephales promelas)
Methylenebiscyclohexanamine, 4,4'-	LC50 (96 h): 46-100 mg/l	Golden orfe (Leuciscus idus)

Toxicity to daphnia (Components)

Methyenebiscyclohexanamine, 4,4'-	EC50 (48 h): 6.84 mg/l	Daphnia magna

Toxicity to algae (Components)

Benzyl alcohol	IC50 (72 h): 700 mg/l	Algae
Methylenebiscyclohexanamine, 4,4'-	EC50 (72 h): 140-200 mg/l	Algae

Toxicity to other organisms: No data available

Persistence and degradability

Biodegradability: No data is available on the product itself.
Mobility: No data available.
Bioaccumulation: No data is available on the product itself.

Bioaccumulation (Components)

Benzyl alcohol	Low bioaccumulation potential
Methleneoxide, polymer with benzenamine, hydrogenated	Does not bioaccumulate

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. It may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

14. TRANSPORTATION INFORMATION

DOT	Not Regulated
IATA	Not Regulated
IMDG	Not Regulated
TDG	Not Regulated

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s): None

Country	Regulatory list	Notifiation
USA	TSCA	Included on Inventory
EU	EINECS	Included on EINECS inventory or polymer substance, monomers included on EINECS inventory or no longer polymer
Canada	DSL	Included on Inventory
Australia	AICS	Included on Inventory
Japan	ENCS	Included on Inventory
South Korea	ECL	Included on Inventory
China	SEPA	Included on Inventory
Philippines	PICS	Included on Inventory

OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA): This Safety Data Sheet (SDS) has been prepared in compliance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification – Acute Health Hazard

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'deminimus' level – None

CERCLA REPORTABLE QUANTITY (RQ) - None

New Jersey Right-to-know: The following is required composition information:
Not listed

Pennsylvania Right-to-know: The following is required composition information:
CAS Number: 100-51-6
Chemical Name: Benzenemethanol
Common Name: Benzyl Alcohol
Comment: Hazardous Substance.

CALIFORNIA PROPOSITION 65: Not listed.

WHMIS:

D2B- Poisonous and Infectious Materials/Other Effects
B3 – Flammable and combustible material – Combustible liquid
E - Corrosive Material

WHMIS Health Effects Criteria Met by this Chemical (benzyl alcohol)

D2B – Eye irritation – toxic - other

16. OTHER INFORMATION

PREPARED BY: ANDREW WATT

THIS INFORMATION IS DRAWN FROM RECOGNIZED SOURCES BELIEVED TO BE RELIABLE. CROSSFIELD PRODUCTS CORP. 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 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. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HMIS 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 over-exposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime over-exposure 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 **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:
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. 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 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 which appear on the materials package label.