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):	**MiraPrime ML, Part B**
CHEMICAL NAME/CLASS:	Polyamine Emulsion
PRODUCT USE:	Specialty Flooring 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:	March 18, 2010
REVISION DATE:	March 22, 2021

2. HAZARD(S) IDENTIFICATION

GHS Classification
- Skin Corrosion / Irritation – Category 1B
- Serious Eye Damage / Eye Irritation – Category 1
- Skin Sensitizer – Category 1A
- Aquatic Environment Acute – Category 1
- Aquatic Environment Chronic - Category 1

Signal Word: (Danger)

Hazard Statements:

H314: Causes severe skin burns and eye damage
H317: May cause an allergic skin reaction
H400: Very toxic to aquatic life
H410: Very toxic to aquatic life with long lasting effects

Precautionary Statements:

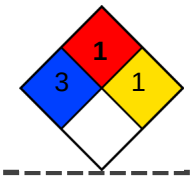
P260: Do not breath dust / fume / gas / mist / vapor / spray
P264: Wash face, hands and any exposed skin thoroughly after handling.
P272: Contaminated work clothing should not b e allowed out of the workplace
P273: Avoid release to the environment
P280: Wear protective gloves / protective clothing / eye protection / face protection
P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340+P310: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P363: Wash contaminated clothing before reuse.
P391: Collect spillage
P501: Dispose of contents/container in accordance with local and national regulations.

HMIS-RATINGS (SCALE 0 – 4)

HEALTH	3
FLAMMABILITY	1
REACTIVITY	1

Health = 3
Fire = 1
Reactivity = 1

NFPA RATING



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
Aliphatic polyamine		40 - 70	NE	NE	NE	NE	NE	NE
2-Propenenitrile, reaction products with 3-amino-1,5,5-trimethylcyclohexanemethanamine	90530-15-7	10 - 30	NE	NE	NE	NE	NE	NE
m-Xylyenediamine	1477-55-0	3 - 7	NE	0.1	0.1	NE	NE	NE
Isophoronediamine	2855-13-2	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).					
VOC: Component = 0 Grams/Liter		As Applied – 60 Grams/Liter (Part of Multi-Component System)						

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

EYE CONTACT: Immediate medical attention is required. Rinse immediately with plenty of water also under the eyelids for at least 20 minutes. Remove contact lenses. Care should to taken not to rinse contaminated water into the unaffected eye.

INHALATION: If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Move to fresh air.

CONTACT WITH SKIN: Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Drench affected area with water for at least 15 minutes. Wash off immediately with plenty of water for at least 20 minutes. Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay.

INGESTION: If swallowed, call an physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): >100°C (212°F) Closed Cup
AUTOIGNITION TEMPERATURE, °C: ND
FLAMMABLE LIMITS (in air by volume, %):

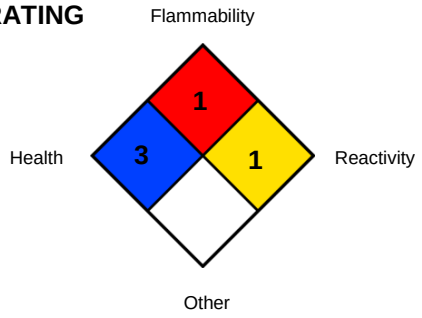
Lower (LEL): NE
Upper (UEL): NE

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.

Vapor Respirator

Safety Glasses

Safety Gloves

Synthetic Apron

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): ND
SPECIFIC GRAVITY (water = 1): 1.1
SOLUBILITY IN WATER: disperseable
VAPOR PRESSURE, mm Hg @ 21 °C: 18.7
ODOR : Amine
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

EVAPORATION RATE (n-BuAc=1): ND
MELTING/FREEZING POINT: Not established.
BOILING POINT: 204°C (400°F)
pH: > 7.0

APPEARANCE AND COLOR: White/Yellow liquid emulsion
HOW TO DETECT THIS SUBSTANCE (warning properties): Litmus paper will turn blue upon contact with this solution.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this solution can include a variety of compounds. (i.e. Carbon dioxide, Carbon Monoxide and other compounds).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Avoid contact with acids, reactive metals, sodium hypochlorite, peroxides, acids, and oxidizers.

HAZARDOUS POLYMERIZATION: Will not occur by itself.

CONDITIONS TO AVOID: Avoid exposure or contact with epoxides, isocyanates.

11. TOXICALOGICAL INFORMATION

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

Likely Routes of Exposure: Oral, Skin, Eyes, Respiratory System.

ACUTE TOXICITY DATA:

Oral	rat	Acute LD50	> 2,000 mg/kg (tested)
Dermal	rabbit	Acute LD50	> 2,000 mg/kg
Inhalation	rat	Acute LD50 4 hr	> 5 mg/l (Dust/Mist)

LOCAL EFFECTS ON SKIN AND EYE:

Acute Irritation	dermal	Corrosive
Acute Irritation	eye	Causes serious damage
Acute Irritation	respiratory	Corrosive

ALLERGIC SENSITIZATION

Sensitization	skin	Severe Sensitizing
Sensitization	respiratory	No data

GENOTOXICITY:

Assays for Gene Mutations

Ames Salmonella Assay No data

SPECIFIC TARGET ORGAN TOXICITY:

Specific target organ toxicity (single exposure):	No data
Specific target organ toxicity (repeated exposure):	No data

OTHER INFORMATION

The product toxicity information above has been estimated.

HAZARDOUS INGREDIENT TOXICITY DATA

The toxicological properties of 2-propenenitrile, reaction products with 3-amino-1,5,5-trimethylcyclohexanemethanamine have not been fully investigated. Direct contact with this material may cause severe eye and skin corrosion. This material may e absorbed through the skin and may cause skin sensitization and damage to mucous membranes.

M-Xylylenediamine has acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values of 930 mg/kg, 2000 mg/kg and 2.4 mg/l, respectively. This material is severely irritating/corrosive to the eyes, skin and mucous membranes. Inhalation of vapor can cause severe irritation/corrosion of the respiratory tract. Ingestion can cause corrosive effects in the mouth, throat, esophagus and stomach. This material has produced skin sensitization in animals.

Isophoronediamine has an acute oral (rat) and dermal (rabbit) LD50 value of 1030 and >2000 mg/kg respectively. The LC50 value following a 4-hour inhalation exposure to rats is 1.07 – 5.01 mg/L. Respiratory difficulties were observed for all animals. Direct contact may cause severe eye and skin irritation. Isophoronediamine causes maked sensitization when tested in laboratory animals. Isophoronediamine was not genotoxic in several studies (in vitro and in vivo). Developmental effects were not observed in a prenatal study in rats. Carcinogenicity has not been investigated.

The acute oral (rat) and dermal (rabbit) LD50 values of aliphatic polyamine are estimated to be >5000 mg/kg and >2000 mg/kg, respectively. Direct contact with this material may cause mild eye and skin irritation.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTIVES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION

Overall Environmental Toxicity: Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

This material is not readily biodegradable.
This material may cause long-term adverse effects in the environment.
This substance may be highly toxic to aquatic organisms.

ALGAE TEST RESULTS
Test: Growth Inhibition (OECD 201)
Duration : 72 h
Species: Pseudokirchneriella subcapitata
ErC50 0.47 mg/l
EbC50 0.098 mg/l

FISH TEST RESULTS
Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 h
Species: Zebra Fish (Brachydanio rerio)
LC50 0.5 – 1.0 mg/l

INVERTEBRATE TEST RESULTS
Test: Acute Immobilization (OECD 202)
Duration: 24, 48 h
Species: Water flea (Daphnia magna)
EC50 2.3, 1.5 mg/l

BACTERIA TEST RESULTS
Test: DIN 38412 T.8
Duration: 16 h
Species: Pseudomonas putida
EC50 >1 – 10 mg/l

DEGRADATION
Test: Manometric Respirometry (OECD 301F)
Duration: 28 day
0%
Test: Closed Bottle (OECD 301D)
Duration: 28 Procedure: Ready biodegradability
0% Complete inhibition of bacteria was observed. This material is not readily biodegradable

RESULTS OF PBT AND vPvB ASSESSMENT
Not determined

HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
2-Propenenitrile, reaction products with 3-amino-1,5,5-trimethylcyclohexanemethanamine 90530-15-7	EC50 = 9.92 mg/l Pseudokirchneriella subcapaitata (72hrs) NOEC = 8.11 mg/L- Pseudokirchneriella subcaitata (72hrs)	LC100 > 100 mg/L - Zebra Fish (Brachydanio rerio - 96 hrs	EC50 > 100 mg/L - Daphnia magna - 48 hrs
m-Xylylenediamine 1477-55-0	Not available	Not available	Not available
Isophoronediamine 2855-13-2	EC50 + 37 mg/L - Desmodesmus subspicatus (72h) NOEC = 1.5 mg/L Desmodesmus subspicatus (72h)	LC50 = 110 mg/L - Leuciscus idus (96h)	EC50 > 23 mg/L - Daphnia magna (48h) NOEC = 8.3 mg/L -Daphnia magna (48h) NOEC = 3 mg/L - Daphnia magna (21d)
Aliphatic polyamine	Not available	Not available	Not available

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

Department of Transportation:

Proper Shipping Name:	Paint Related Material
Class:	8
UN/ID	UN3066
Packing Group:	II
Transport Labels Required	Corrosive & Marine Pollutant

Note: Marine Pollutants – DOT requirements specific to Marine Pollutants do not apply to non-bulk packagings transported by motor vehicles, rail cars or aircraft.

Transport Canada:

Proper Shipping Name:	Paint Related Material
Class:	8
UN/ID	UN3066
Packing Group:	II
Transport Labels Required	Corrosive & Marine Pollutant
Marine Pollutant:	Yes
Technical Name (N.O.S.)	(Xylylenediamine, Isophoronediamine, Aliphatic Polyamine)

ICAO / IATA:

Proper Shipping Name:	Paint Related Material
Class:	8
UN/ID	UN3066
Packing Group:	II
Transport Labels Required	Corrosive
Technical Name (N.O.S.)	(Xylylenediamine, Isophoronediamine)

IMDG:

Proper Shipping Name:	Paint Related Material
Class:	8
UN/ID	UN3066
Packing Group:	II
Transport Labels Required	Corrosive & Marine Pollutant
Marine Pollutant:	Yes
Technical Name (N.O.S.)	(Xylylenediamine, Isophoronediamine, Aliphatic Polyamine)

15. REGULATORY INFORMATION

Inventory Information:

United States (USA):	TSCA - Listed
Canada	DSL – Listed
Australia:	AICS – Listed
China	Listed – or not required
Japan	ENCS and ISHL- Listed or not required
Korea	ECL – one component not listed
Philippines:	PICCS – one component not listed
Taiwan	TCSI – Listed or not required
Switzerland::	All components are exempt (SR 813.11 art 24-26)

OTHER ENVIRONMENTAL INFORMATION:
The following components of the product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.)

This product does not contain any components regulated under the section of the EPA:

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA - Acute

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

New Jersey Right-to-know: The following is required composition information:
CAS Number: 1477-55-0 (RTK No. 1320)
Chemical Name: m-XYLENE alpha, alpha'DIAMINE

Pennsylvania Right-to-know: The following is required composition information
CAS Number: 1477-55-0
Chemical Name: m-XYLENE alpha, alpha'DIAMINE

CALIFORNIA PROPOSITION 65: Not Listed

Canadian DSL: All components of this product are on the Canadian DSL.

WHMIS:
D2B - Poisonous and Infectious Material – Other effects - Toxic
E – Corrosive material

WHMIS Health Effects Criterial Met by this Chemical
D2B – Skin sensitization – toxic - other
E – TDG class 8 - Corrosive material

16. OTHER INFORMATION

PREPARED BY: BILL BEACH CROSSFIELD PRODUCTS CORP,

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 (**REL**s). 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.