CROSSFIELD PRODUCTS CORPORATION

www.crossfieldproducts.com

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 – 5:00 PM Eastern Time)

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**Epox-O-Fill Underlayment, Part A**
CHEMICAL NAME/CLASS:	Modified Epoxy Resin
PRODUCT USE:	Specialty Flooring Resin
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:	October 5, 2016
REVISION DATE:	July 24, 2020

2. HAZARD(S) IDENTIFICATION

GHS Classification

Skin irritation (Category 2)
Eye irritation (Category 2A)
Skin sensitization (Category 1)
Acute aquatic toxicity (Category 2)
Chronic aquatic toxicity (Category 2)

Signal Word: (Warning)

Hazard Statements:

H333: May be harmful if inhaled
H315: Causes skin irritation
H303: May be harmful if swallowed
H335: May cause respiratory irritation
H319: Causes serious eye irritation
H317 May cause an allergic skin reaction
H402: Harmful to aquatic life

Precautionary Statements:

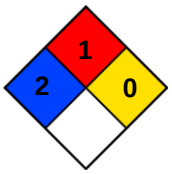
P102: Keep out of reach of children
P103: Read label before use
P260 Do not breathe dust/fume/gas/mist/vapors/spray
P261: Avoid breathing dust / fume / gas / mist / vapors / spray
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection
P302 + P352: IF ON SKIN: Wash with plenty of soap and 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.
P333 + P313: If skin irritation or rash occurs: Get medical advice / attention
P337 + P313: If eye irritation persists: Get Medical advice / attention.
P362: Tale off contaminated clothing and wash before reuse.
P391: Collect spillage
P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.

HMIS-RATINGS (SCALE 0 – 4)

HEALTH	2
FLAMMABILITY	1
REACTIVITY	0

Health = 2
Fire = 1
Reactivity = 0

NFPA RATING



3. COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			
			TLV mg/m³	STEL mg/m³	PEL mg/m³	STEL mg/m³	IDLH mg/m³	OTHER mg/m³
Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane	25068-38-6	40 - 70	NE	NE	NE	NE	NE	NE
Calcium Carbonate	1317-65-3	15 - 40	10	NE	Total Dust 15 Resp. Dust 5	NE	NE	NE
Alkyl c12-c14 glycidyl ether	68609-97-2	43835	NE	NE	NE	NE	NE	NE
Hexylene Glycol	107-41-5	1 – 5	25 ppm	NE	NE	NE	NE	NE
Fatty Acid Methyl Esters	67784-80-9	1 - 5	NE	NE	NE	NE	NE	NE
Amorphous Silica	112926-00-8	1 - 5	Note 1	NE	Note 2	NE	NE	ND
Titanium Dioxide**	13463-97-7	0 - 5	10	NE	TWA 10	NE	NE	NE
Iron Oxide (Yellow)**	51274-00-1	0 - 5	TWA 5 mg/m³	NE	10	NE	ND	
Iron Oxide (Red)**	1309-37-1	0 - 5	TWA 5 mg/m³	NE	TWA Total Dust 15 mg/m³	NE	ND	OSHA TWA Resp. Dust 5 mg/m³
Carbon Black	1333-86-4	0.1 – 1	TWA 3.5	NE	TWA 3.5 mg/m³	NE	ND	
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 = 9 grams/liter			As Applied (Part of a multi-component system) =3 grams/liter					

**Exposure limits are only meaningful when hardened product is abraded, ground, etc.

Note 1: ACGIH (Total amorphous dust) TWA 10 mg/m³ (Respirable nuisance particulate) TWA 3 mg/m³
Note 2: OSHA (Total dust) TWA 6 mg/m3³
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. Consult a physician. Discard or decontaminate clothing before re-use.

EYE EXPOSURE: For eye contact, flush eyes for at least 15 minutes with running water. Hold eyelids apart to ensure rinsing of the entire eye surface and lids. Consult a physician.

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

INGESTION: If swallowed rinse mouth with water, but do not induce vomiting. Do not give anything by mouth to an unconscious person. Consult a physician.

5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): 96.0°C (205°F) Closed Cup
AUTOIGNITION TEMPERATURE, °C: ND
FLAMMABLE LIMITS (in air by volume, %):

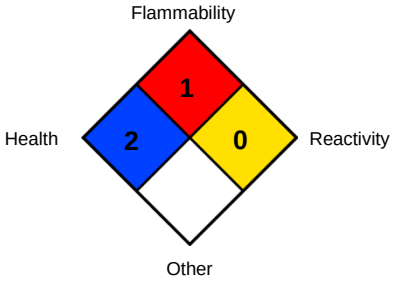
Lower (LEL): NE
Upper (UEL): NE

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 – 1.35
SOLUBILITY IN WATER: Not soluble.
VAPOR PRESSURE, mm Hg @ 20 °C: ND
ODOR : Slight
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

EVAPORATION RATE (n-BuAc=1): ND
MELTING/FREEZING POINT: Not established.
BOILING POINT: > 200°C (>392°F)
pH: Not Established

APPEARANCE AND COLOR: Colored viscous 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. carbon monoxide, carbon dioxide, aldehydes, nitrogen oxides and other compounds).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product reacts with strong oxidizers and amines.

HAZARDOUS POLYMERIZATION: Will not occur by itself. Considerable exothermic reaction with amine resins is possible.

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

11. TOXICALOGICAL INFORMATION

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

	CAS 25068-38-6	CAS 68608-97-2
Acute Oral Effects (LD50):	(Rat) > 2,000 mg/kg	(Rat) >19,000 mg/kg
Acute Dermal Toxicity (LD50):	(Rabbit) > 2,000 mg/kg	(Rabbit) > 4,500 mg/kg
Skin Irritation:	(Rabbit) Slight Irritation	(Rabbit) Moderate Irritation
Eye Irritation:	(Rabbit) Slight Irritation	(Rabbit) Mild Irritation
Sensitization:		May cause sensitization by skin contact
Mutagenicity:		Ames in vitro - Negative

	CAS 11296-00-8	CAS 107-41-5	
Acute Oral Effects (LD50):		(Rat) > 5,000 mg/kg	(Rat) 4,700 mg/kg
Acute Inhalation Toxicity (LC50)		Nuisance dust	Rat 1 hr) >60 ppmv
Acute Dermal Toxicity (LD50):		ND	(Rabbit) 12,000 mg/kg
Skin Irritation:		Mild Irritation	
Eye Irritation:		Mild Irritation	

Carcinogenicity — CAS 25068-38-6

Result	Species	Dose	Exposure
Negative - Oral-NOAEL	Rat - Male, Female	15 mg/kg	2 years; 7 days per week
Negative - Dermal - NOEL	Rat - Female	1 mg/kg	2 years; 5 days per week
Negative - Dermal - NOEL	Mouse - Male	0.1 mg/kg	2 years; 3 days per week

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 moderately irritating 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 CAS 25068-38-6

Test	Experiment	Result
OECD 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Positive
OECD 476 *In Vitro* Mammalian Cell Gene Mutation Test	Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic Metabolic activation: +/-	Positive
OECD 478 Genetic Toxicoloty: Rodent Dominant Lethal Test	Experiment: In vivo Subject: Mammalian-Animal	Negative
EPA OPPTS	Cell: Germ Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative

Teratogenicity CAS 25068-38-6

Result	Species	Dose	Exposure
Negative - Oral	Rat - Female	>540 mg/kg NOEL:	10 days
Negative - Dermal	Rabbit - Female	>300 mg/kg NOEL:	13 days; 6 hours per day
Negative - Oral	Rabbit - Female	180 mg/kg NOAEL	13 days

Reproductive Toxicity CAS 25068-38-6

Maternal Toxicity	Fertility	Development Toxin	Species	Dose	Exposure
Negative	Negative	Negative	Rat - Male, Female	Oral: 540 mg/kg NOEL:	238 days; 7 days per week

Potential chronic health effects

Chronic effects : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Target Organs : No know significant effects or critical hazards.
Carcinogenicity : No know significant effects or critical hazards.
Mutagenicity : No know significant effects or critical hazards.
Teratogenicity : No know significant effects or critical hazards.
Fertility effects : No know significant effects or critical hazards.
Developmental effects : No know significant effects or critical hazards.

Medical conditions aggravated by over-exposure
Pre-existing skin disorders may 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.

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.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

Aquatic ecotoxicity

Bisphenol A epoxy resin

Test	Result	Species	Exposure
202 Daphnia sp. Acute Immobilisation Test	Acute EC50 3.6 mg/L	Daphnia - Daphnia magna Straus 1820	24 hours
ECC (1988)	Acute IC50 > 100 mg/L	Bacteria – Aerobic bacteria	3 hours
203 Fish, Acute Toxicity Test	Acute LC50 1.5 mg/L	Fish – Rainbow trout (Oncorhynchus mykiss, Salmo gairdneri)	96 hours

Reaction product: bisphenol A-(epichlorhydrin); epoxy resin

Test	Result	Species	Exposure
	Acute EC50 9.4 mg/L Fresh water	Algae	72 hours Static
OECD 202 Daphnia sp. Acute Immobilisation Test	Acute EC50 1.7 mg/L Fresh water	Daphnia	48 hours Static
	Acute IC50 >100 mg/L Fresh water	Bacteria	3 hours Static
OECD 203 Fish, Acute Toxicity Test	Acute LC50 1.5 mg/L Fresh water	Fish	96 hours Static
OECD 211 Daphnia Magna Reproduction Test	Chronic NOEC 0.3 mg/L Fresh water	Daphnia	21 days Semi-static

Biodegradability

Reaction product: bisphenol A-(epichlorhydrin); epoxy resin

Test	Result	Dose	Exposure
OECD Derived from OECD 301F (Biodegradation Test)	5% - Not readily -28 days	20 mg/L Oxygen consumption	-

Other Ecological Information

Biological Oxygen Demand (BOD 5 Day) : Not Determined

Chemical Oxygen Demand (COD) : Not Determined

Aquatic half-life	Photolysis	Biodegradability
Fresh water 4.83 days	-	Not readily
Fresh water 3.58 days		
Fresh water 7.1 days		

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:

Not Regulated

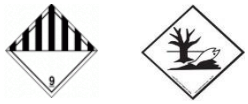
(Not Regulated for quantities less than 450 Liters (118 Gallons))

TDG

Name:	Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A Epoxy Resin) Marine Pollutant
UN Number	UN3082
Class	9
Packing Group	III

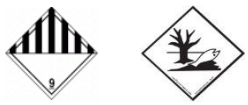
IMDG

Name:	Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A Epoxy Resin) Marine Pollutant
UN Number	UN3082
Class	9
Packing Group	III
Emergency Schedules (EMS)	F-A, S-
Marine Pollutant	Yes (Bisphenol A Epoxy Resin)



IATA-DGR

Name:	Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A Epoxy Resin)
UN Number	UN3082
Class	9
Packing Group	III
Marine Pollutant	Yes (Bisphenol A Epoxy Resin)



15. REGULATORY INFORMATION

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

SARA REPORTING REQUIREMENTS: The components of this product are not subject to the reporting requirements of Sections 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

SARA Threshold Planning Quantity: Not applicable.

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

CERCLA REPORTABLE QUANTITY (RQ): Not listed

OTHER FEDERAL REGULATIONS: Not applicable.

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

New Jersey Right-to-know: The following is required composition information:

CAS No,	1333-86-4	13463-67-7	107-41-5
RTK No.	(342)	(1861)	(1003)
Common Name:	Carbon Black	Titanium Dioxide	Hexylene Glycol

Pennsylvania Right-to-know: The following is required composition information:

CAS No,	1309-37-1	1333-86-4	13463-67-7
Common Name:	Iron Oxide	Carbon Black	Titanium Dioxide

CALIFORNIA PROPOSITION 65: ⚠ The below list of compounds is known to the State of California to cause cancer, birth defects or other reproductive harm: Carcinogen

CAS No,	1333-86-4	13463-67-7
Common Name:	Carbon Black	Titanium Dioxide

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

WHMIS Classification:

D2B - Poisonous and infectious material - Other effects - Toxic

WHMIS Health Effects Criteria Met by this Chemical:

D2B - Eye irritation - toxic - other
D2B - Skin Sensitization - toxic - other

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.