CROSSFIELD PRODUCTS CORPORATION

www.crossfieldproducts.com

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(310)-886-9100 (8:00 AM – 5:00 PM Pacific Time)

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SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**Spectrum Terrazzo Matrix**
CHEMICAL NAME/CLASS:	Modified Cement
PRODUCT USE:	Deck Covering Polymer Admix
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:	February 2, 2009
REVISION DATE:	January 7, 2021

2. HAZARD(S) IDENTIFICATION

GHS Classification:

- •Acute Toxicity Oral – Category 4
- •Acute Toxicity Dermal – Category 4
- •Acute Toxicity Inhalation – Category 3
- •Skin Corrosion/Irritation – Category 1B
- •Eye Damage – Category 1
- •Respiratory Sensitization – Category 1
- •Skin Sensitization – Category 1
- •Carcinogenicity – Category 1A
- •Specific Target Organ Toxicity Repeated – Category 1

Signal Word: Danger

Hazard Statements:

- •H333: May be harmful if inhaled
- •H335: May cause respiratory irritation
- •H318: Causes serious eye damage
- •H303: May be harmful if swallowed
- •H373: May cause damage to organs through prolonged or repeated exposure (lungs)
- •H331: Toxic if inhaled
- •H314: Causes severe skin burns and eye damage
- •H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
- •H317: May cause an allergic skin reaction
- •H350: May cause cancer

Precautionary Statements:

- •P102: Keep out of reach of children
- •P103: Read label before use
- •P280: Wear protective gloves/protective clothing/eye protection/face protection
- •P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.
- •P264: Wash … thoroughly after handling
- •P270: Do not eat, drink or smoke when using this product
- •P272: Contaminated work clothing should not be allowed out of the workplace
- •P260: Do not breathe dust/fume/gas/mist/vapors/spray
- •P271: Use only outdoors or in a well-ventilated area
- •P285: In case of inadequate ventilation wear respiratory protection

HMIS-RATINGS (SCALE 0 – 4)

HEALTH	2
FLAMMABILITY	0
REACTIVITY	0

Health = 2
Fire = 0
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:

INHALATION: It is possible to breathe this material under certain conditions of handling and use (for example, during mixing or spraying in a confined area). Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful.

CONTACT WITH SKIN or EYES: Contact with the eyes may cause slight transient (temporary) eye irritation. Corneal injury is unlikely. Prolonged or repeated skin contact may dry the skin. Symptoms may include redness, drying and cracking of skin. Additional symptoms of skin contact may include: allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects), and numbness.

INGESTION: Ingestion is not anticipated to be a significant route of over-exposure to this product.

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

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). Prolonged or repeated exposure may cause liver and kidney damage.

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
Portland Cement	65997-15-1	40 - 70	10	NE	Cal/OSHA PEL Totall 10 mg/m³ Resp. 5 mg/m³	NE	NE	Total Dust 15 Resp. Dust 5
Silicone Dioxide	14808-60-7	15 - 40	Quartz: 0.025 mg/m³ Cristobalite: 0.025 mg/m³ Tridymite: Not Listed	NE		NE	NE	10 mg/m³ Cristobalite & Tridymite: 5 mg/m³
Gypsum	13397-24-5	1 - 5	10	NE	Cal/OSHA PEL 5 mg/m³			Total Dust 15 Resp. Dust 5
Limestone	1317-65-3	0 - 3	10	NE	Cal/OSHA PEL 5 mg/m³	NE		Total Dust 15 Resp. Dust 5
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			VOC as applied (Part of a multi-component system) = 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.

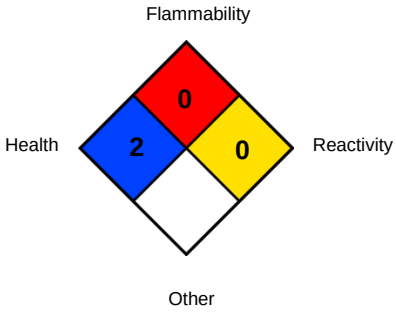
EYE EXPOSURE: For eye contact, immediately flush eyes for at least 15 minutes with running water. Hold eyelids apart to ensure rinsing of the entire eye surface and lids with water. Get immediate medical attention.

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.

5. FIRE-FIGHTING MEASURES

NFPA RATING



FLASH POINT, °C (method): NA
AUTOIGNITION TEMPERATURE: Non Combustible
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NE
Upper (UEL): NE

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES
Foam: YES
Halon: YES
Carbon Dioxide: YES
Dry Chemical: YES
Other: Any "ABC" Class.

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, and other 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. **Keep from freezing.**

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 grounded, 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 SDS (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.

Dust Respirator

Safety Glasses

Safety Gloves

Synthetic Apron

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): NA
SPECIFIC GRAVITY (water = 1): NE
VAPOR PRESSURE, mm Hg @ 20°C: ND
ODOR : No Distinct Odor
LOG WATER/OIL DISTRIBUTION COEFFICIENT: NA
SOLUBILITY IN WATER: Insoluble
APPEARANCE AND COLOR: This product is a powder of various colors .
HOW TO DETECT THIS SUBSTANCE: (warning properties): ND

EVAPORATION RATE (n-BuAc=1): NA
MELTING/FREEZING POINT: ND
BOILING POINT: NA
pH: (in water) 9 – 13

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Will not spontaneously occur. Adding water results in hydration and produces (caustic) calcium hydroxide.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Incompatible with acids, ammonium salts, and aluminum metal.

HAZARDOUS POLYMERIZATION: Will not occur by itself.

CONDITIONS TO AVOID: Avoid unintentional contact with water and incompatible chemicals.

11. TOXICALOGICAL INFORMATION

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

Toxicity Data Silicone Dioxide (14808-60-7)

Organism	Test Type	Route	Reported Dose	Effect	Source
Dog	LDLo[1]	Intravenous	20 mg/kg		Biochemical Journal, Vol. 27, Pg. 1007, 1933
Human	LCLo[2]	Inhalation	0.3 mg/m³	Liver: Other Changes	Annals of the New York Academy of Sciences, Vol. 127, Pg. 324, 1976
Human	TCLo[3]	Inhalation	16 mppcf (million particles per cu. ft.)	LUNGS, THORAX, or RESPIRATION: " Fibrosis, Focal (Pneumoconiosis)" LUNGS, THORAX, or RESPIRATION: Cough LUNGS, THORAX, or RESPIRATION: Dyspnea	National Technical Information Service. Vol. PB246-697
Mouse	LD4	Intratracheal	>20 mg/kg	LUNGS, THORAX, or RESPIRATION: Other Changes	American Review of Respiratory Disease, Vol. 141(Suppl), Pg. A3-A937, 1990
Mouse	LDLo[1]	Intravenous	40 mg/kg		Journal of the National Cancer Institute Vol. 1, Pg. 241, 1940
Rat	LDLo[1]	Intratracheal	200 mg/kg	LUNGS, THORAX, or RESPIRATION: " Fibrosis, Focal (Pneumoconiosis)"	British Journal of Industrial Medicine. Vol. 10, Pg. 9, 1953
Rat	LDLo[1]	Intravenous	90 mg/kg		Journal of the National Cancer Institute Vol. 57, Pg. 509, 1976

[1]LDLo – (Lethal Dose Low), the low est dose of material to cause death in the organism.
[2]LCLo – (Lethal Concentration Low), the low est concentration of material in air at w hich death occurs. (Gases, mists, dusts, or vapor
[3]TCLo – (Toxic Concentration Low), the low est concentration of a material in air at w hich toxic effects occur. (Gases, mists, dusts, o
4LD – (Lethal Dose), the dose at w hich lethality occurs in the single test organism.

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

SUSPECTED CANCER AGENT:
IARC classifies crystalline silica in Group 1, "known human carcinogen."
NTP classifies respirable crystalline silica in a category of substances which is "known to be a human carcinogen"

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: 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

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
No ecological information available.

13. DISPOSAL CONSIDERATIONS

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

EPA WASTE NUMBER:

14. TRANSPORTATION INFORMATION

Department of Transportation:	Not Regulated
Reportable Quantity (RQ):	None
Sea Transport (IMDG):	Not Regulated
Air Transport (ICAO/IATA):	Not Regulated

15. REGULATORY INFORMATION

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.

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

US. EPA CERCLA Hazardous Substances (40 CFR 302): Components - None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A): Components - None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65): Components – None

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

OTHER FEDERAL REGULATIONS: Status under the Federal Hazardous Substances Act and its Regulations:

Portland cement is a “hazardous substance” subject to the following labeling requirements for consumer use:

WARNING: INJURIOUS TO EYES, CAUSES SKIN IRRITATION. READ THIS WARNING BEFORE USING.

Contact with cement (including unhardened concrete, mortar, wet cement, or cement mixtures) can cause skin irritation, severe chemical burns, or serious eye damage. Avoid contact with eyes and skin. Wear waterproof gloves, a fully buttoned long-sleeved shirt, full-length trousers, and tight fitting eye protection when working with these materials. If you have to stand in cement or wet concrete, use waterproof boots that are tight at tops and high enough to keep cement or concrete from flowing into them. If you are finishing concrete, wear knee pads to protect knees. Wash cement, wet concrete, mortar, wet cement, or cement mixtures from you skin with fresh, clean water immediately after contact. Indirect contact through clothing can be as serious as direct contact, so promptly rinse out cement, wet concrete, mortar, wet cement, or cement mixtures from clothing. Seek immediate medical attention if you have persistent or severe discomfort, in case of eye contact, flush with plenty of water for at least 15 minutes. Consult a physician immediately.

KEEP OUT OF REACH OF CHILDREN.

USER AGREES TO CONVEY THIS WARNING TO ALL PERSONS WHO MAY PURCHASE, USE OR COME IN CONTACT WITH CEMENT, WET (UNHARDENED) CONCRETE, MORTAR, WET CEMENT OR CEMENT MIXTURES.

Component State Regulatory Information: The following components appear on one or more of the following state hazardous substances lists:

Component	C.A.S.	CA	MA	MN	NJ	PA	RI
Cement, portland, chemicals	65997-15-1	No	Yes	Yes	Yes	Yes	No
Limestone	1317-65-3	No	Yes	Yes	Yes	Yes	No
Gypsum (Ca(SO4).2H2O)	13397-24-5	No	No	Yes	Yes	Yes	No
Quartz	14808-60-7	Yes	Yes	Yes	Yes	Yes	No

CALIFORNIA PROPOSITION 65: ⚠ This product contains chemicals known by the State of California to cause cancer, birth defects, or other reproductive harm. Carcinogens:

14808-60-7 Quartz

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

WHMIS SYMBOLS: Class E – Corrosive Material

Class D - Poisonous and Infectious Material
Division 2 Material Causing Other Toxic Effects

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.