

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, and Canadian WHMIS Standards

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	ATAC PAK[®] CPK Reagent Kit
PRODUCT NUMBER (AS LABELED):	517-018
CHEMICAL NAME/CLASS:	Not Applicable
SYNONYMS:	Not applicable
PRODUCT USE:	In-Vitro Diagnostic Reagents
SUPPLIER/MANUFACTURER'S NAME:	Vital Diagnostics, Inc.
ADDRESS:	27 Wellington Road Lincoln, RI 02865 USA
EMERGENCY PHONE:	1-760-602-8700
BUSINESS PHONE:	1-401-642-8400; 1-800-345-2822
DATE OF PREPARATION:	June 1, 2008

2. COMPOSITION and INFORMATION ON INGREDIENTS

This Material Safety Data sheet describes the CPK REAGENT KIT. This product consists of the following Three reagents: CPK Reagent 1, CPK Reagent 2, and CPK Activator.

CHEMICAL NAME	CAS #	% v/v	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH mg/m ³	OTHER mg/m ³
			TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³		

COMPONENT 1: CPK REAGENT 1 (F8926vA)

Imidazole	288-32-4	1-5	NE	NE	NE	NE	NE	NE
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).	Balance	The remaining components do not contribute any significant additional hazards. All pertinent information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).						

COMPONENT 2: CPK REAGENT 2 (F8927vA)

Sorbitol	50-70-4	< 20	NE	NE	NE	NE	NE	NE
N-Acetyl Cysteine	616-91-1	1-5	NE	NE	NE	NE	NE	NE
Dithiothreitol	3483-12-3	1-5	NE	NE	NE	NE	NE	NE
Tris(hydroxymethyl)amino-methane (TRIS)	77-86-1	1-5	NE	NE	NE	NE	NE	NE
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).	Balance	The remaining components do not contribute any significant additional hazards. All pertinent information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).						

COMPONENT 3: CPK ACTIVATOR (F8928vA)

Creatine Phosphate	9001-15-4	5-15	NE	NE	NE	NE	NE	NE
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).	Balance	The remaining components do not contribute any significant additional hazards. All pertinent information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).						

NE = Not Established

See Section 16 for Definitions of Terms Used

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: The components of this product are clear, colorless, odorless liquids. **Health Hazards:** The chief hazard in event of contamination or overexposure to this product is the potential for irritation of contaminated skin or eyes. **Flammability Hazards:** If involved in a fire, the components of this product may decompose to produce toxic gases (e.g., carbon oxides, nitrogen oxides, sulfur oxides, phosphorus oxides). **Reactivity Hazards:** Negligible. **Environmental Hazards:** Negligible. **Emergency Recommendations:** Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: No adverse health effects should occur from routine, occupational use of this product's components in the manner specified by the manufacturer's instructions. The potential health effects of the components of this product are as follows:

INHALATION: Inhalation of vapors, mists, or sprays of this product's components may mildly irritate the nose, throat, and lungs. Symptoms should be alleviated upon breathing fresh air

CONTACT WITH SKIN or EYES: Contact with the skin or eyes may cause mild irritation, which is alleviated upon rinsing.

SKIN ABSORPTION: No component of this product is known to be absorbed through intact skin.

INGESTION: Ingestion is not anticipated to be a significant route of exposure for this product's components. If these components are swallowed they may cause gastric distress. Large doses may cause nausea, vomiting, and diarrhea.

INJECTION: Accidental injection of this product's components, via laceration or puncture by a contaminated object, may cause local redness, tissue swelling, and discomfort in addition to the wound.

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

ACUTE: Severe inhalation and ingestion exposure may be irritating.

CHRONIC: These components are not known to cause any significant chronic health effects.

TARGET ORGANS: ACUTE: Skin, respiratory system. CHRONIC: None known.




HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	1
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FLAMMABILITY	(RED)	0
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REACTIVITY	(YELLOW)	0
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PROTECTIVE EQUIPMENT	B
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EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		

For Routine Applications

See Section 16 for Definition of Ratings

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

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to physician or health professional with victim.

SKIN EXPOSURE: Basic hygiene should prevent any problems. If contact with this product causes redness, inflammation, or irritation, flush the exposed area with running water. Remove any contaminated clothing, taking care not to contaminate eyes.

EYE EXPOSURE: If liquid or vapors of this product's components enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. **Minimum** flushing is for 15 minutes.

INHALATION: If vapors, mists, or sprays of this product's components are inhaled, causing irritation, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

INGESTION: If this product's components are swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is **unconscious, having convulsions, or unable to swallow**. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing dermatitis and other skin conditions may be aggravated by overexposure to components of this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

(LEL): Not applicable.

(UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: In the event of a fire, use suppression methods for surrounding materials.

Water Spray: YES

Carbon Dioxide: YES

Dry Chemical: YES

Halon: YES

Other: Any "ABC" Class.

Foam: YES

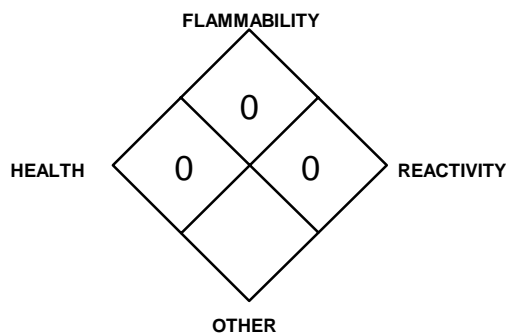
UNUSUAL FIRE AND EXPLOSION HAZARDS: In a fire situation, this product presents negligible hazards to fire fighters. When involved in a fire, this product's components will decompose and produce irritating vapors and toxic gases (including carbon oxides, nitrogen oxides, sulfur oxides, phosphorus oxides).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Move containers from fire area if it can be done without risk to personnel. Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING



**See Section 16 for
Definition of Ratings**

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: For small releases take basic hygiene precautions. Lightweight gloves, a lab coat, and eye protection should be worn. Absorb spilled liquid with paper towels. Trained personnel using pre-planned procedures should respond to large releases that are not immediately controlled. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel. In the event of a non-incident release, minimum Personal Protective Equipment should be **Level D: lab-gloves, chemical resistant apron, boots, and splash goggles. Respiratory protection should not be necessary.** Absorb spilled liquid with polypads or other suitable absorbent materials. Decontaminate the area thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada (see Section 13, Disposal Considerations).

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

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product's components ON YOU or IN YOU. Wash thoroughly after handling this product's components. Avoid splashing or spraying this product's components. Do not eat or drink while handling this product's components. Follow SPECIFIC USE INSTRUCTIONS supplied with this product.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Do NOT pour these solutions down the drain. Open containers slowly on a stable surface. Keep container tightly closed when not in use. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care. Store away from incompatible materials (see Section 10, Stability and Reactivity). Store this product in original container at controlled room temperature of 2-8°C (36-46°F). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely, as applicable. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or appropriate standards of Canada. All disposable items contaminated with this product should be disposed of properly.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients) if applicable. Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Respiratory protection is not generally needed during routine use of this product. Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients) if applicable. Use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, or Canadian CSA Standard Z94.4-93. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EYE PROTECTION: Splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133.

HAND PROTECTION: Wear latex or rubber gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task (e.g., coveralls, Tyvek® suit).

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not established.

SPECIFIC GRAVITY (water = 1): Not established.

VAPOR PRESSURE, mm Hg @ 20°C: Not established.

ODOR THRESHOLD: Not available.

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

APPEARANCE AND COLOR: Clear, colorless liquids.

HOW TO DETECT THIS SUBSTANCE: There are no unusual warning properties associated with these components.

EVAPORATION RATE (nBuAc = 1): Similar to water.

FREEZING/MELTING POINT: Similar to water.

pH: 6.5–9.5

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product's components may produce carbon oxides, nitrogen oxides, sulfur oxides, phosphorus oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, strong acids, some metals, substances that are incompatible with water.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Any conditions that are incompatible with water, mixing this product with incompatible chemicals.

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following information is available for the constituents in components of this product present in greater than 1 percent concentration.

N-ACETYL-L-CYSTEINE:

TDLo (multiple routes, child) = 8480 mg/kg/3 days/intermittent; Liver: liver function tests impaired

LD₅₀ (oral, rat) = 5050 mg/kg

LD₅₀ (intravenous, rat) = 1140 mg/kg

LD₅₀ (oral, mouse) = 4400 mg/kg

LD₅₀ (intraperitoneal, mouse) = 400 mg/kg

LD₅₀ (intravenous, mouse) = 3800 mg/kg; Brain and Coverings: recordings from specific areas of CNS; Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: other changes

LD₅₀ (oral, dog) > 1 g/kg

LD₅₀ (intraperitoneal, dog) = 700 mg/kg

LD₅₀ (intravenous, dog) = 700 mg/kg

CREATINE PHOSPHATE:

Currently, there are no toxicological data available for this compound.

DITHIOTHREITOL:

LD₅₀ (intraperitoneal, mouse) = 154 mg/kg

DITHIOTHREITOL (continued):

LD₅₀ (intramuscular, mouse) = 108 mg/kg;

Behavioral: convulsions or effect on seizure threshold

IMIDAZOLE:

DNA Inhibition (human cells) = 1 mmol/L

TDLo (intraperitoneal, mouse) = 150 mg/kg;

male 1 day pre-mating: Reproductive: Paternal Effects: impotence

LD₅₀ (oral, rat) = 220 mg/kg

LD₅₀ (subcutaneous, rat) = 626 mg/kg

LD₅₀ (oral, mouse) = 880 mg/kg

LD₅₀ (subcutaneous, mouse) = 817 mg/kg

LD₅₀ (intraperitoneal, mouse) = 300 mg/kg

LD₅₀ (intravenous, mouse) = 475 mg/kg

LD₅₀ (oral, guinea pig) = 760 mg/kg

LD₅₀ (oral, mammal) = 1 g/kg

LD₅₀ (subcutaneous, dog) = 28 mg/kg

LDLo (subcutaneous, cat) = 125 mg/kg;

Behavioral: food intake (animal), rigidity (including catalepsy); Nutritional and Gross

Metabolic: body temperature decrease

SORBITOL:

Cytogenetic Analysis (hamster, ovary) = 300 mmol/L

TDLo (oral, woman) = 1700 mg/kg/ days;

Gastrointestinal: hypermotility, diarrhea

LD₅₀ (oral, rat) = 15,900 mg/kg

LD₅₀ (subcutaneous, rat) = 29,600 mg/kg

LD₅₀ (intravenous, rat) = 7100 mg/kg

LD₅₀ (oral, mouse) = 17,800 mg/kg

LD₅₀ (intraperitoneal, mouse) = 15 g/kg

LD₅₀ (subcutaneous, mouse) = 24 g/kg

LD₅₀ (intravenous, mouse) = 9480 mg/kg

TRIS(HYDROXYMETHYL)AMINOMETHANE

(TRIS):

LD₅₀ (oral, rat) = 5900 mg/kg

LD₅₀ (intravenous, rat) = 1800 mg/kg

LD₅₀ (intravenous, mouse) = 1210 mg/kg

LDLo (oral, rabbit) = 1 g/kg; Behavioral: somnolence (general depressed activity), muscle weakness, coma

SUSPECTED CANCER AGENT: The constituents in this product's components are not found on the following lists: NTP, IARC, FEDERAL OSHA Z-List, and CAL-OSHA and therefore are neither considered to be nor suspected to be cancer causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with the skin or eyes may cause mild irritation, which is alleviated upon rinsing.

SENSITIZATION TO THE PRODUCT: The components of this product are not known to cause skin or respiratory sensitization in humans.

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. Human mutation data are available for the imidazole constituent in a component of this product; these data were obtained during clinical studies on specific human tissues exposed to high doses of this compound.

11. TOXICOLOGICAL INFORMATION (Continued)

REPRODUCTIVE TOXICITY INFORMATION (continued):

Embryotoxicity: This product is not reported to cause human embryotoxic effects.

Teratogenicity: This product is not reported to cause teratogenic effects in humans.

Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently, there are no Biological Exposure Indices (BEIs) determined for the constituents in this product's components.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this product will degrade in the environment into smaller organic and inorganic constituents. Additional environmental data are available as follows:

SORBITOL:

Terrestrial Fate: Based on a classification scheme, an estimated Koc value of 2, determined from a log Kow of -2.2 and a regression-derived equation, indicates that Sorbitol is expected to have very high mobility in soil. Volatilization of Sorbitol from moist soil surfaces is not expected to be an important fate process given an estimated Henry's Law constant of 7.3×10^{-13} atm-cu m/mole, using a fragment constant estimation method. Sorbitol is not expected to volatilize from dry soil surfaces based upon an estimated vapor pressure of 4.9×10^{-9} mm Hg, determined from a fragment constant method. Sorbitol is a simple sugar alcohol and should be readily biodegraded in the environment.

Aquatic Fate: Based on a classification scheme, an estimated Koc value of 2, determined from a log Kow of -2.2 and a regression-derived equation, indicates that Sorbitol is not expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is not expected based upon an estimated Henry's Law constant of 7.3×10^{-13} atm-cu m/mole, developed using a fragment constant estimation method. According to a classification scheme, an estimated BCF of 1, determined from its log Kow and a regression-derived equations, suggests the potential for bioconcentration in aquatic organisms is low. Sorbitol is a simple sugar alcohol and should be readily biodegraded in the environment.

Atmospheric Fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere, Sorbitol, which has an estimated vapor pressure of 4.3×10^{-9} mm Hg at 25°C, is expected to exist in the particulate phase in the ambient atmosphere. Particulate-phase Sorbitol may be removed from the air by wet and dry deposition.

Bioconcentration: An estimated BCF of 1 was calculated for Sorbitol, using a log Kow of -2.2 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

TRIS(HYDROXYMETHYL)AMINOMETHANE (TRIS):

Water solubility = 55–80 g/ 100 mL (20°C)

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Release of large quantities of this product's components into the environment may have adverse effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Release of large quantities of this product's components into an aquatic environment may have adverse effects on aquatic plants or animals.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada. 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. Do NOT pour these solutions down the drain.

U.S. EPA WASTE NUMBER: Not applicable to wastes consisting only of this product.

14. TRANSPORTATION INFORMATION

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not Regulated

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): Not Applicable

MARINE POLLUTANT: No component of this product is designated as a DOT Marine Pollutant (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is not considered as dangerous goods, per regulations of Transport Canada.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The constituents in this product's components are not subject to Sections 302, 304, and 313 reporting requirements under the Superfund Amendment and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: This product is regulated by the Food and Drug Administration; it is exempt from the requirements of TSCA.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: Components of this product listed in Section 2 (Composition and Information on Ingredients) are covered under State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No.

California - Permissible Exposure Limits for Chemical Contaminants: No.

Florida - Substance List: No.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: No.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: No.

Missouri - Employer Information/Toxic Substance List: No.

New Jersey - Right to Know Hazardous Substance List: No.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List: No.

Rhode Island - Hazardous Substance List: No.

Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance List: No.

Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No chemical constituent of this product is on the California Proposition 65 lists.

U.S. ANSI STANDARD LABELING (Z129.1): **CAUTION!** MAY CAUSE SKIN AND EYE IRRITATION. Do not taste or swallow. Avoid skin and eye contact. Avoid prolonged or repeated skin contact. Avoid breathing mists or sprays. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves and goggles. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention if necessary. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foams. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL STATUS: The components of this product are listed on the DSL Inventory.

CANADIAN WHMIS IDL DISCLOSURE STATUS: The components of this product have no disclosure requirement levels.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITY SUBSTANCES LISTS: The components of this product are not on the Priority Substances Lists.

WHMIS SYMBOLS: Not applicable.

16. OTHER INFORMATION

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.

EXPOSURE LIMITS IN AIR:

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

TLV - Threshold Limit Value - an airborne concentration of a substance that 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 absorption 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 that was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

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 overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure 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 **National Fire Protection Association (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: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause death. **BEI** - Biological Exposure Indices, represent the levels of determinants 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. **Superfund Amendments and Reauthorization Act (SARA)**; the **Canadian Domestic Substances List (DSL)**; the U.S. **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings that appear on the materials package label.