

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[®] ISE Buffer Reagent Kit
PRODUCT NUMBER (AS LABELED): 547-008
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

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		
Boric Acid	10043-35-3	1-5	NE	NE	NE	NE	NE	NE
Tetramethylammonium Hydroxide	75-59-2	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).					

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: This product is a clear, colorless, odorless liquid. **Health Hazards:** The chief hazard in event of contamination or overexposure to this product is the potential for mild 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, boron oxides, and nitrogen 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.

3. HAZARD IDENTIFICATION (Continued)

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

INHALATION: Inhalation of vapors, mists, or sprays of this product 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 may cause mild irritation, which is alleviated upon rinsing. Repeated skin contact may cause dermatitis (dry, red skin). Eye contact may cause irritation and tearing.

SKIN ABSORPTION: The components of this product are not known to be absorbed through intact skin.

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




INJECTION: Accidental injection of this product, 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 mildly irritating.

CHRONIC: Repeated skin contact may cause dermatitis (dry, red skin).

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

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH		(BLUE)	1
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			B
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.

5. FIRE-FIGHTING MEASURES (Continued)

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

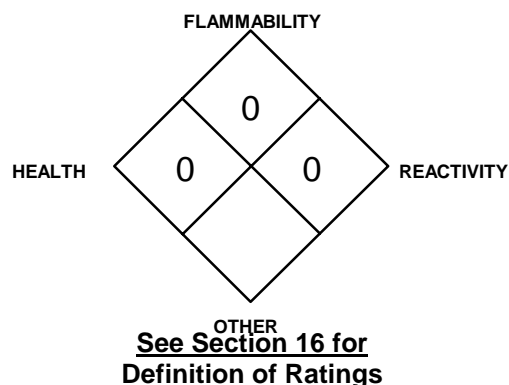
Water Spray: YES Carbon Dioxide: YES
Dry Chemical: YES Halon: YES
Other: Any "ABC" Class. Foam: YES

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, boron oxides, and nitrogen 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



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 ON YOU or IN YOU. Wash thoroughly after handling this product. Avoid splashing or spraying this product. Do not eat or drink while handling this product. 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 this solution 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 15–30°C (59–86°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.

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.

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): 1.006

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

ODOR THRESHOLD: Not available.

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

APPEARANCE AND COLOR: Clear, colorless liquid.

HOW TO DETECT THIS SUBSTANCE: There are no unusual warning properties associated with this product.

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

FREEZING/MELTING POINT: Similar to water.

pH: 8.6

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product may produce carbon oxides, boron oxides, and nitrogen 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 components of this product present in greater than 1 percent concentration.

BORIC ACID:

Mutation in Microorganisms (*Escherichia coli*) = 17,000 ppm/24 hours

Sperm Morphology (oral, rat) = 6 mg/kg

Skin Irritancy (human) = 15 mg/3 days/intermittent; Mild irritation effects

TDLo (oral, child) = 500 mg/kg; Gastrointestinal tract effects

TDLo (oral, infant) = 800 mg/kg/4 weeks/intermittent.

TDLo (unreported, man) = 170 mg/kg; Gastrointestinal tract effects

TDLo (oral, rat) = 45 g/kg/90 days/male; Reproductive effects

TDLo (oral, rat) = 45 g/kg/90 days/continuous; Brain and Coverings: changes in brain weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: changes in testicular weight

TDLo (oral, rat) = 68 mg/kg/9 weeks/intermittent; Weight loss or decreased weight gain, changes in calcium, changes in phosphorus

TDLo (oral, rat) = 6600 mg/kg/female 1–21 days after conception; Reproductive: Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities, musculoskeletal system, other developmental abnormalities

TDLo (oral, rat) = 45 g/kg/male 90 days pre-mating; Reproductive: Paternal Effects: testes, epididymis, sperm duct

TDLo (oral, rat) = 5390 mg/kg/female 6–15 days after conception; Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Effects on Embryo or Fetus: fetal, Specific Developmental Abnormalities: musculoskeletal system

TDLo (oral, rat) = 1596 mg/kg/female 0–20 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: musculoskeletal

BORIC ACID (continued):

TDLo (oral, rat) = 52 mg/kg/male 26 weeks pre-mating; Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count)

TCLo (inhalation, rat) = 9600 µg/m³/4 hours/male 16 weeks pre-mating; Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct

TDLo (oral, mouse) = 42 g/kg/14 days/continuous; Related to Chronic Data: death

TDLo (oral, mouse) = 156 g/kg/13 weeks/intermittent; Gastrointestinal: other changes; Blood: changes in spleen; Related to Chronic Data: death

TDLo (oral, mouse) = 7684 mg/kg/female 1–17 days after conception; Reproductive: Effects on: fetotoxicity (except death, e.g., stunted fetus)

TDLo (oral, mouse) = 17051 mg/kg/female 1–17 days after conception; Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

TDLo (oral, mouse) = 18054 mg/kg/female 1–18 days after conception; Reproductive: Maternal Effects: uterus, cervix, vagina, Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

TDLo (oral, mouse) = 8136 mg/kg/female 1–18 days after conception; Reproductive: Maternal Effects: other effects, Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (oral, rabbit) = 3500 mg/kg/female 6–19 days after conception; Specific Developmental Abnormalities: cardiovascular (circulatory) system

TDLo (oral, rabbit) = 3500 mg/kg/female 6–19 days after conception; Post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), litter size (e.g. # fetuses per litter; measured before birth), Specific Developmental Abnormalities: cardiovascular (circulatory) system

BORIC ACID (continued):

TDLo (oral, rabbit) = 1750 mg/kg/female 7–20 days after conception; Reproductive: uterus, cervix, vagina

TDLo (oral, rabbit) = 3500 mg/kg/female 7–20 days after conception; Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: musculoskeletal

TDLo (oral, rabbit) = 3500 mg/kg/female 6–19 days after conception; Reproductive: Specific Developmental Abnormalities: craniofacial (including nose and tongue), other developmental abnormalities

TDLo (oral, dog) = 23 g/kg/90 days/continuous; Changes in liver weight; Changes in thyroid weight; Changes in testicular weight

LDLo (oral, man) = 429 mg/kg; Cardiovascular effects, Systemic effects

LDLo (oral, woman) = 200 mg/kg

LDLo (oral, infant) = 934 mg/kg

LDLo (skin, infant) = 1200 mg/kg

LDLo (skin, child) = 4 g/kg/4 days

LDLo (skin, man) = 2430 mg/kg

LDLo (skin, child) = 1500 mg/kg

LDLo (subcutaneous, infant) = 1100 mg/kg

LD₅₀ (oral, rat) = 2660 mg/kg

LCLo (inhalation, rat) = 28 mg/m³/4 hours

LD₅₀ (subcutaneous, rat) = 1400 mg/kg

LD₅₀ (intravenous, rat) = 1330 mg/kg

LD₅₀ (oral, mouse) = 3450 mg/kg

LDLo (intraperitoneal, mouse) = 800 mg/kg

LD₅₀ (subcutaneous, mouse) = 1740 mg/kg

LD₅₀ (intravenous, mouse) = 1240 mg/kg

LDLo (oral, dog) = 1780 mg/kg; Meningeal changes; Lungs, Thorax, or Respiration:

cyanosis; Gastrointestinal: nausea or vomiting

LDLo (subcutaneous, dog) = 1000 mg/kg

LDLo (parenteral, dog) = 1 g/kg

11. TOXICOLOGICAL INFORMATION (continued)

TOXICITY DATA:

BORIC ACID (continued):

LDLo (subcutaneous, rabbit) = 150 mg/kg
LDLo (intravenous, rabbit) = 800 mg/kg;
Somnolence (general depressed activity),
ataxia; Body temperature decrease
LDLo (parenteral, rabbit) = 670 mg/kg: Nutritional
and Gross Metabolic: body temperature
decrease

BORIC ACID (continued):

LDLo (oral, rabbit) = 4 g/kg; Behavioral: tremor;
Gastrointestinal: hypermotility, diarrhea,
nausea or vomiting
LDLo (oral, guinea pig) = 1 g/kg; Gastrointestinal:
nausea or vomiting, other changes
LD₅₀ (subcutaneous, guinea pig) = 1200 mg/kg;
Behavioral: tremor; Gastrointestinal:
hypermotility, diarrhea, nausea or vomiting

TETRAMETHYLAMMONIUM HYDROXIDE:

LD₅₀ (skin, guinea pig) = 25 mg/kg; Skin and
Appendages: dermatitis, other (after systemic
exposure)
LDLo (subcutaneous, mouse) = 19 mg/kg
LDLo (intravenous, rabbit) = 1 mg/kg
LDLo (parenteral, frog) = 5 mg/kg
LDLo (unreported, frog) = 1515 µg/kg

SUSPECTED CANCER AGENT: The components of this product 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.

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. Animal mutation data are available for the Boric Acid component of this product; these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

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. Clinical studies on test animals exposed to relatively high doses of the Boric Acid component of this product indicate adverse reproductive effects.

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 (BEIs): Currently, there are no Biological Exposure Indices (BEIs) determined for the components of this product.

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 for components of this product as follows:

BORIC ACID:

Soil Adsorption/Mobility: Some boron (in boron compounds, such as Boric Acid) is adsorbed by iron and aluminum hydroxy compounds and clay minerals. Finer textured soils retain added boron longer than do coarse, sandy soils.

Soil Adsorption/Mobility: Boron sorption by clay minerals and iron and aluminum oxides is pH dependent, with maximum sorption in the range 7–9. The amount of boron adsorbed depends on the surface area of the clay or oxide and this sorption is only partially reversible.

Persistence: Natural calcium may slowly precipitate out as borate but not below levels toxic to plants.

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

EFFECT OF CHEMICAL ON AQUATIC LIFE: Release of large quantities of this product into an aquatic environment may have adverse effects on aquatic plants or animals. Additional aquatic toxicity data are available for components of this product as follows:

BORIC ACID:

LC₅₀ (trout eggs) = 100 ppm/ soft
LC₅₀ (trout eggs) = 79 ppm/ hard
LC₅₀ (catfish eggs) = 155 ppm/ soft
LC₅₀ (catfish eggs) = 22 ppm/ hard

BORIC ACID (continued):

LC₅₀ (goldfish eggs) = 46 ppm/ soft
LC₅₀ (goldfish eggs) = 75 ppm/ hard
LC₅₀ (*Daphnia magna*) = 133 mg/L/ 48 hours

TETRAMETHYLAMMONIUM HYDROXIDE:

LC₅₀ (*Chaetogammarus marinus*) 96 hours = 17 mg/

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

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.	Minnesota - List of Hazardous Substances: No.	Pennsylvania - Hazardous Substance List: No.
California - Permissible Exposure Limits for Chemical Contaminants: No.	Missouri - Employer Information/Toxic Substance List: No.	Rhode Island - Hazardous Substance List: No.
Florida - Substance List: No.	New Jersey - Right to Know Hazardous Substance List: Tetramethylammonium Hydroxide.	Texas - Hazardous Substance List: No.
Illinois - Toxic Substance List: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.	West Virginia - Hazardous Substance List: No.
Kansas - Section 302/313 List: No.		Wisconsin - Toxic and Hazardous Substances: No.
Massachusetts - Substance List: No.		
Michigan - Critical Materials Register: No.		

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component 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" foam. **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; **TD₀₁**, **LDLo**, and **LDo**, or **TC**, **TC₀₁**, **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.