### 1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED):** CPK Reagent Kit  
**PRODUCT NUMBER (AS LABELED):** 1441  
**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:**  
Americas: 1-760-476-3962  
Europe, Middle East & Africa: 1-760-476-3961  
Asia Pacific: 1-760-476-3960  
Global Response Access Code: 333483  
**BUSINESS PHONE:** 1-401-642-8400; 1-800-345-2822  
**MANUFACTURED FOR:** PSS World Medical Inc.  
4345 Southpoint Blvd.  
Jacksonville, FL 32216  
**DATE OF PREPARATION:** March 24, 2011

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

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

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>% v/v</th>
<th>EXPOSURE LIMITS IN AIR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ACGIH-TLV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA</td>
</tr>
<tr>
<td>Imidazole</td>
<td>288-32-4</td>
<td>1-5</td>
<td>NE</td>
</tr>
<tr>
<td>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</td>
<td>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).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorbitol</td>
<td>50-70-4</td>
<td>&lt; 20</td>
<td>NE</td>
</tr>
<tr>
<td>N-Acetyl Cysteine</td>
<td>616-91-1</td>
<td>1-5</td>
<td>NE</td>
</tr>
<tr>
<td>Dithiothritol</td>
<td>3483-12-3</td>
<td>1-5</td>
<td>NE</td>
</tr>
<tr>
<td>Tris:(hydroxymethyl)aminomethane(TRIS)</td>
<td>77-86-1</td>
<td>1-5</td>
<td>NE</td>
</tr>
<tr>
<td>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</td>
<td>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).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

COMPONENT 3 : CPK ADDITIVE (F9507 vA)

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>Concentration</th>
<th>Health</th>
<th>Flammability</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatine Phosphate</td>
<td>9001-15-4</td>
<td>5-15</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

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  NIC = Notice of Intended Change  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, except for CPK REAGENT 2, which has a strong sulfur odor. 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, phosphorus oxides, sodium oxide, 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.

SYMPTOMS OF OVER EXPOSURE 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 this product’s components are as follows:

INHALATION: Inhalation of vapors, mists, or sprays of this product’s components may mildly irritate the nose, throat, and lungs. Symptoms may include coughing and sneezing.

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’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, eyes, CHRONIC: None.
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 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, 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 products components will decompose and produce irritating vapors and toxic gases (including carbon oxides, phosphorus oxides, sodium 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.
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 suitable absorbent materials. 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-incipient 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 containers at controlled temperature 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 appropriate. Before maintenance begins, decontaminate equipment thoroughly. 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 or equivalent Canadian Standard.

HAND PROTECTION: Wear latex or rubber gloves for routine industrial use. Use 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

FOR CPK REAGENT 1
RELATIVE VAPOR DENSITY (air = 1): Not established.  EVAPORATION RATE (nBuAc = 1): Similar to water.
SPECIFIC GRAVITY (water = 1): 0.999-1.010.  FREEZING/MELTING POINT: Similar to water.
VAPOR PRESSURE, mm Hg @ 20°C: Not established.  pH: 6.5–7.5
ODOR THRESHOLD: Not available.
APPEARANCE AND COLOR: Clear, colorless liquid.
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.
HOW TO DETECT THIS SUBSTANCE: There are no unusual warning properties associated with these components.

FOR CPK REAGENT 2
RELATIVE VAPOR DENSITY (air = 1): Not established.  EVAPORATION RATE (nBuAc = 1): Similar to water.
SPECIFIC GRAVITY (water = 1): Not established.  FREEZING/MELTING POINT: Similar to water.
VAPOR PRESSURE, mm Hg @ 20°C: Not established.  pH: 6.0-7.0
ODOR THRESHOLD: Not available.
APPEARANCE AND COLOR: Clear, colorless liquid.
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.
HOW TO DETECT THIS SUBSTANCE: There is a strong sulfur odor.

FOR CPK ADDITIVE
RELATIVE VAPOR DENSITY (air = 1): Not established.  EVAPORATION RATE (nBuAc = 1): Similar to water.
SPECIFIC GRAVITY (water = 1): Not established.  FREEZING/MELTING POINT: Similar to water.
VAPOR PRESSURE, mm Hg @ 20°C: Not established.  pH: 11-13
ODOR THRESHOLD: Not available.
APPEARANCE AND COLOR: Clear, colorless liquid.
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.
HOW TO DETECT THIS SUBSTANCE: There are no unusual warning properties associated with these components.

10. STABILITY and REACTIVITY

STABILITY: Stable.
DECOMPOSITION PRODUCTS: Thermal decomposition of this product’s components may produce carbon oxides, phosphorus oxides, sulfur 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 constituents in components of this product present in greater that 1 percent concentration.

N-ACETYL-L-CYSTEINE:
TDL0 (multiple routes, child) = 8480 mg/kg/3 days/intermittent; Liver: liver function tests impaired
TD50 (oral, rat) = 5050 mg/kg
TD50 (intravenous, rat) = 1140 mg/kg
TD50 (oral, mouse) = 4400 mg/kg
TD50 (intraperitoneal, mouse) = 400 mg/kg
TD50 (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
TD50 (oral, rdog) > 1g/kg
TD50 (intraperitoneal, dog) = 700 mg/kg
TD50 (intravenous, dog) = 700 mg/kg

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

DITHIOTHREITOL:
TD50 (intraperitoneal, mouse) = 154 mg/kg
11. TOXICOLOGICAL INFORMATION (Continued)

**TD₅₀ (intramuscular, mouse)** = 108 mg/kg; Behavioral: convulsions or effect on seizure threshold

**IMIDAZOLE:**
- DNA Inhibition (human cells) = 1 mmol/L
- TDL₀ (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
- TD₅₀ (intraperitoneal, mouse) = 300 mg/kg
- TD₅₀ (intravenous, mouse) = 475 mg/kg
- LD₅₀ (oral, guinea pig) = 760 mg/kg
- LD₅₀ (oral, mammal) = 1 g/kg
- LD₅₀ (subcutaneous, dig) = 28 mg/kg
- LD₅₀ (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
- TDL₀ (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 (subcutaneous, mouse) = 24 g/kg
- LD₅₀ (intraperitoneal, mouse) = 15 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
- LDL₀ (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.

**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.
- **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.

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 importance fate process given an estimated Henry's Law Constant of 7.3 x 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 x 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 x 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 x 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.

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 the environment may have adverse effects on 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
EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): Not Applicable
MARINE POLLUTANT: Not applicable (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is considered as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The constituents in this product’s components of 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. TSCL 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.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Tetramethylammonium Hydroxide.
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 component of this product is on the California Proposition 65 lists.

U.S. ANSI STANDARD LABELING (Z129.1):

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL 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 that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

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.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELs: NIOSH’s Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA’s Permissible Exposure Limits. 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.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

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.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD:

0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. Skin Irritation: Essentially non-irritating. Pall or Draize = “0”. Eye Irritation: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = “0”. Oral Toxicity LD50 Rat: < 5000 mg/kg. Dermal Toxicity LD50 Rat or Rabbit: < 2000 mg/kg. Inhalation Toxicity 4 hrs LC50 Rat: < 20 mg/L; 1 (Slight Hazard: Minor reversible injury may occur; slightly or mildly irritating. Skin Irritation: Slightly or mildly irritating. Eye Irritation: Slightly or mildly irritating. Oral Toxicity LD50 Rat: > 5000 mg/kg. Dermal Toxicity LD50 Rat or Rabbit: > 1000-2000 mg/kg. Inhalation Toxicity LC50 4-hrs Rat: > 2-20 mg/L); 2 (Moderate Hazard: Temporary or transitory injury may occur. Skin Irritation: Moderately irritating; primary irritant; sensitizer. Pall or Draize > 0, < 5. Eye Irritation: Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 5-25. Oral Toxicity LD50 Rat: > 50-500 mg/kg. Dermal Toxicity LD50 Rat or Rabbit: > 200-1000 mg/kg. Inhalation Toxicity LC50 4-hrs Rat: > 0.5-2 mg/L); 3 (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. Skin Irritation: Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. Pall or Draize > 5-8 with destruction of tissue. Eye Irritation: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. Oral Toxicity LD50 Rat: > 1-50 mg/kg. Dermal Toxicity LD50 Rat or Rabbit: > 20-200 mg/kg. Inhalation Toxicity LC50 4-hrs Rat: > 0.05-0.5 mg/L); 4 (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. Skin Irritation: Not appropriate. Do not rate as a “4”, based on skin irritation alone. Eye Irritation: Not appropriate. Do not rate as a “4”, based on eye irritation alone. Oral Toxicity LD50 Rat: ≤ 1 mg/kg. Dermal Toxicity LD50 Rat or Rabbit: ≤ 20 mg/kg. Inhalation Toxicity LC50 4-hrs Rat: ≤ 0.05 mg/L).

FLAMMABILITY HAZARD:

0 (Minimal Hazard—Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); 1 (Slight Hazard—Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] [e.g. OSHA Class IIIIB; or, Most ordinary combustible materials [e.g. wood, paper, etc.]); 2 (Moderate Hazard—Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, Including: Liquids having a flash-point at or above 37.8°C [100°F] [e.g. OSHA Class IIA, or; Most ordinary combustible materials [e.g. wood, paper, etc.]); 3 (Serious Hazard—Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, Including: Liquids having a flash-point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IIB and IC]); 4 (Severe Hazard—Materials that will rapidly or completely vaporize at atmospheric pressure and normal conditions or;

FLAMMABILITY HAZARD: ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable
DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

**FLAMMABILITY HAZARD (continued):**
cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below (e.g. pyrophoric)].

**PHYSICAL HAZARD:**
0 (Water Reactivity: Materials that do not react with water. Organic Peroxides: Materials that are normally stable even under fire conditions and will not react with water. Explosives: Substances that are Non-Explosive. Unstable Compressed Gases: No Rating. Pyrophorics: No Rating. Oxidizers: No “0” rating allowed. Unstable Reactives: Substances that will not polymerize, decompose, condense or self-react.). 1 (Water Reactivity: Materials that change or decompose upon exposure to moisture. Organic Peroxides: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. Explosives: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. Compressed Gases: Pressure below OSHA definition. Pyrophorics: No Rating. Oxidizers: Packaging Group III. Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3.7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. Unstable Reactives: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of initiators.).
2 (Water Reactivity: Materials that may react violently with water. Organic Peroxides: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. Explosives: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. Compressed Gases: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. Pyrophorics: No Rating. Oxidizers: Packaging Group II. Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chloride solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. Unstable Reactives: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature).
3 (Water Reactivity: Materials that may form explosive reactions with water. Organic Peroxides: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. Explosives: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. Compressed Gases: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. Pyrophorics: No Rating. Oxidizers: Packaging Group I. Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchoric acid (50%)/cellulose mixture. Unstable Reactives: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.).
4 (Water Reactivity: Materials that react explosively with water without requiring heat or confinement. Organic Peroxides: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. Explosives: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. Compressed Gases: No Rating. Pyrophorics: Add to the definition of Flammability “4”. Oxidizers: No “4” rating. Unstable Reactives: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).
PPE Rating B: Hand and eye protection is required for routine chemical use. PPE Rating C: Hand, eye, and body protection may be required for routine chemical use.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

**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”.

**TOXICOLOGICAL INFORMATION:**

**Human and Animal Toxicology:** 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: LD₉₀ - Lethal Dose (solids & liquids) which kills 90% of the exposed animals; LC₉₀ - 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. Other measures of toxicity include TDL₀, the lowest dose to cause a symptom and TCL₀ the lowest concentration to cause a symptom; TDₐ, LDL₀, and LD₀, or TC, TCo, LC₀, and LCo, the lowest dose (or concentration) to cause lethal or toxic effects. Cancer Information: 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 Information: BEI - ACGIH Biological Exposure Indices, represent the levels of determinants which
DEFINITIONS OF TERMS (Continued)

TOXICOLOGICAL INFORMATION (continued):
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.

ECOLOGICAL INFORMATION:
EC is the effect concentration in water. $BCF =$ Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. $TLm =$ median threshold limit; Coefficient of Oil/Water Distribution is represented by $\log K_{ow}$ or $\log K_{oc}$ and is used to assess a substance’s behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA:
This section explains the impact of various laws and regulations on the material. ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. EPA is the U.S. Environmental Protection Agency. 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). 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/Non-Domestic Substances List (DSL/NDSL); the U.S. Toxic Substance Control Act (TSCA); Marine Pollutant status according to the DOT; 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 material’s package label. OSHA - U.S. Occupational Safety and Health Administration.

EUROPEAN: EC is the European Community (formerly known as the EEC, European Economic Community). EINECS: This the European Inventory of Now-Existing Chemical Substances. The ARD is the European Agreement Concerning the International Carriage of Dangerous Goods by Road and the RID are the International Regulations Concerning the Carriage of Dangerous Goods by Rail. AUSTRALIAN: AICS is the Australian Inventory of Chemical Substances. NOHSC: National Occupational Health & Safety Code.