PART I

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): Powdered Cleanser
CHEMICAL NAME/CLASS: Sodium Carbonate Mixture
PRODUCT USE: Draft Line Cleaner
U.S. SUPPLIER/MANUFACTURER’S NAME: ABC CHEMICAL COMPANY
U.S. ADDRESS: 1000 Technology Drive
Hometown, USA 00000
U.S. BUSINESS PHONE: 1-888-888-8888
EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC) [Within U.S. and Canada]
DATE OF PREPARATION: January 28, 2006

2. COMPOSITION and INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>% w/w</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 mg/m³</td>
</tr>
<tr>
<td>Chlorine Capped Ethoxylated C10-14 Alcohols</td>
<td>61702-77-0</td>
<td>1.88%</td>
<td>NE</td>
</tr>
<tr>
<td>Sodium Carbonate, Soda Ash, Light</td>
<td>497-19-8</td>
<td>40.0%</td>
<td>NE</td>
</tr>
<tr>
<td>Sodium Percarbonate (Exposure limits are for Particulates, Not Otherwise Classified)</td>
<td>4452-58-8</td>
<td>58.0%</td>
<td>NE</td>
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<td></td>
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</tr>
<tr>
<td>Other trace components. Each of the other components are present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).</td>
<td>Balance</td>
<td></td>
<td>None of the other components in this mixture contribute significantly to the hazards associated with this component. All pertinent hazard information has been provided in this Material Safety Data Sheet, per the requirements of the U.S. Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and the Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).</td>
</tr>
</tbody>
</table>

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: Product Description: This product is a white to off-white, irritating solid. Health Hazards: This product may irritate contaminated tissue, especially in the presence of moisture. Depending on the duration of contact, overexposures to solutions of this material can irritate or burn the skin. Depending on the duration of contact, overexposures can irritate or burn the eyes. Fire Hazards: This product would have to be strongly heated in order for ignition to occur. Accumulation of dusty can cause a danger of air/dust explosion. Thermal decomposition of this product produces irritating vapors and toxic gases (e.g. potassium oxides, hydrogen chloride, sodium oxides, carbon monoxide and carbon dioxide). Reactivity Hazards: This product is not reactive. Environmental Hazards: This product may damage plants and animals if released to a terrestrial or aquatic environment. The product presents no bioaccumulation hazard. Emergency Considerations: In the event of fire or spill, adequate precautions must be taken. Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product, via route of exposure, are as follows:

INHALATION: If dusts or particulates of this product are inhaled, symptoms of exposure may include difficulty breathing, irritation of the mucus membranes, coughing, nasal congestion, and a sore throat. Severe overexposure may damage the tissues of the respiratory system and cause potentially fatal lung conditions (e.g., chemical pneumonitis and pulmonary edema). Chronic low-level inhalation of dust of this product may cause permanent damage to lung tissue and reduction of lung capacity, including development of emphysema and other lung conditions. Chronic inhalation exposures may cause dental erosion and perforation of the nasal septum.
3. HAZARD IDENTIFICATION (Continued)

CONTACT WITH SKIN or EYES: Depending on the duration of skin contact, skin overexposures may cause reddening, discomfort, or irritation. Solutions of the product are alkaline and may irritate the skin or cause chemical burns. Chemical burns can cause blistering of the skin and scarring. Repeated skin-overexposures to low concentrations can cause dermatitis (inflammation and reddening of the skin). There is some evidence that the Sodium Percarbonate component may cause skin sensitization and allergic reaction in susceptible individuals. Symptoms can include itching, rash, or welts. Eye contact may cause moderate to severe irritation, pain, reddening, watering, and blindness. Other eye symptoms may result from absorption of sodium carbonate into the bloodstream.

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

INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, it may cause gastric discomfort. Symptoms of such overexposure can include nausea, vomiting, and diarrhea. Ingestion of large amounts may cause a shock-like state, fall of blood pressure, slow pulse, cyanosis, coma, hypocalcemic tetany (dangerous lowering of serum calcium levels), and metabolic acidosis. Ingestion of large amounts of this product may also be corrosive to the gastrointestinal tract and cause severe abdominal pain, vomiting, diarrhea, collapse, or death.

INJECTION: Accidental injection of this product, via laceration or puncture by a contaminated object, may cause pain and irritation in addition to the wound.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. In the event of exposure, the following symptoms may be observed:

ACUTE: Depending on the duration of contact, overexposures can moderately to severely irritate or burn the eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, it may irritate the respiratory system and cause coughing and difficulty breathing. Severe inhalation and ingestion overexposures may be fatal.

CHRONIC: Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Prolonged inhalation of the vapors may cause dental erosion, nasal perforation, and respiratory disorders (e.g., bronchitis). Repeated ingestion of this product can cause tooth erosion. Some evidence exists that the Sodium Percarbonate component may cause sensitization and allergic skin reaction in susceptible individuals.

TARGET ORGANS: Acute: Skin, eyes, respiratory system, esophagus. Chronic: Skin, respiratory system.

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. Remove or cover gross contamination to avoid exposure to rescuers. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or health professional with victim.

SKIN EXPOSURE: If the product contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Do NOT interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

EYE EXPOSURE: If this product enters 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. Do NOT interrupt flushing.

INHALATION: If dusts or particulates of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if any adverse effect occurs.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Rinse mouth with water immediately if conscious. Victim should drink milk, egg whites, or large quantities of water to dilute chemical. 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. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.
4. FIRST-AID MEASURES (Continued)

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing dermatitis and respiratory problems may be aggravated by overexposure to this product.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable.
AUTOIGNITION TEMPERATURE: Not flammable.
FLAMMABILITY LIMITS (in air by volume, %):
- Lower (LEL): Not applicable.
- Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: This material will not contribute significantly to the intensity of a fire. Use extinguishing material suitable to the surrounding fire.
- Water Spray: YES
- Carbon Dioxide: YES
- Foam: YES
- Dry Chemical: YES
- Halon: YES
- Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product poses a slight fire hazard at elevated temperatures. Solutions of this product may be corrosive and so present a possible contact hazard to firefighters. When involved in a fire, this product may decompose and produce irritating fumes and toxic gases (e.g., carbon monoxide, carbon dioxide, hydrogen chloride, potassium oxides, sodium oxides). It is important to note that, as with all organic solids, large dust clouds of this product have the potential to ignite explosively.

- Explosion Sensitivity to Mechanical Impact: Not applicable.
- Explosion Sensitivity to Static Discharge: Although this product is not sensitive to static discharge, dusts of this material can be ignited by static discharge, especially if large amounts of dusts are allowed to accumulate. All equipment in used in the handling of this material should be electrically grounded.

SPECIAL FIRE-FIGHTING PROCEDURES: Prevent the spread of any released product to combustible objects. Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move fire-exposed containers of this product out of area if it can be done without risk to firefighters. If this product is involved in a fire, fire runoff water should be contained to prevent possible environmental damage.

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Monitor the area for levels of this product's components and the level of oxygen. Monitoring must indicate that exposure levels are below those provided in Section 2 (Composition and Information on Ingredients) and that oxygen levels are above 19.5% before anyone is permitted in the area without Self-Contained Breathing Apparatus. Small releases can be swept up or cleaned up using a damp sponge or poly pads, avoiding generation of dusts and wearing gloves, goggles, and suitable body protection. The minimum Personal Protective Equipment recommended for response to non-incidental releases should be Level B: triple-gloves (neoprene gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus. Neutralize residue with citric acid or other neutralizing agent for basic compounds. Decontaminate the area thoroughly. Test area with litmus paper to ensure neutralization. Place all spill residue in a suitable container. Dispose of in accordance with applicable U.S. Federal, State, and local procedures or appropriate Canadian standards (see Section 13, Disposal Considerations).

PART III How can I prevent hazardous situations from occurring?

7. HANDLING and STORAGE

WORK AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of corrosion resistant materials. Post warning and “NO SMOKING” signs in storage and use areas, as appropriate. Empty containers may contain product which can be harmful; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers which held this product.
7. HANDLING and STORAGE (Continued)

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. Always use this product in areas where adequate ventilation is provided. Before maintenance begins, decontaminate equipment with neutralizing agent appropriate for basic materials and follow with a triple-rinse with water. Test equipment with litmus paper to ensure neutralization is complete. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. If necessary, vent material to outside, taking appropriate precautions to prevent environmental contamination. Ensure eyewash/safety shower stations are available near where this product is used.

RESPIRATORY PROTECTION: Use NIOSH approved respirators if ventilation is inadequate to control dusts. Maintain airborne contaminate concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, the Canadian CSA Standard Z94.4-93, or applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA’s Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Use approved safety goggles or safety glasses as described in OSHA 29 CFR 1910.133. Splash goggles with a faceshield may be needed if solutions of this product are made and a splash hazards exists. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or Canadian Standards.

HAND PROTECTION: Wear chemical impervious gloves (e.g., rubber, Neoprene). 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., Tyvek suit, rubber apron) to protect from splashes and sprays of solutions of this product. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee’s feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE: Powdered solid.
FREEZING POINT: Not applicable.
VAPOR PRESSURE: Not applicable.
VAPOR DENSITY: Not applicable.
ODOR THRESHOLD: Not established.
LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not established.
APPEARANCE, ODOR AND COLOR: This product is a white to off-white, highly irritating solid with an acrid odor.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance may act as warning a property associated with this product in the event of an accidental release. Litmus paper will turn purple/blue upon contact with solutions of this product.

STABILITY: Stable.
DECOMPOSITION PRODUCTS: Thermal decomposition of this product may generate carbon monoxide, carbon dioxide, sodium, hydrogen chloride, and phosphorous oxides.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids, oxidizers, aluminum, fluorine, sulfuric acid, zinc, hydrogen peroxides, lithium, phosphorous pentoxide, 2,4-dinitrotoluene, 2,4,6-trinitrotoluene.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Avoid contact with incompatible chemicals.

10. STABILITY and REACTIVITY

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicology data for components greater than 1 percent in concentration is provided below:

SODIUM CARBONATE, SODA ASH, LIGHT:
Standard Draize Test (Skin-Rabbit, adult) 500 mg/24 hours: Mild irritation effects
Standard Dazae Test (Eye-Rabbit, adult) 100 mg/24 hours: Moderate irritation effects
Standard Dazae Test (Eye-Rabbit, adult) 100 mg/30 seconds: Mild irritation effects

SODIUM CARBONATE, SODA ASH, LIGHT (continued):
Standard Draize Test (Eye-Rabbit) 50 mg: Severe
LD50 (Oral-Rat) 4090 mg/kg
LD50 (Oral-Mouse) 6600 mg/kg
LD50 (Intraperitoneal-Rabbit) 117 mg/kg
LD50 (Subcutaneous-Mouse) 2210 mg/kg
LD50 (Oral-Mouse) 6600 mg/kg

SODIUM CARBONATE, SODA ASH, LIGHT (continued):
LD50 (Intraperitoneal-Mouse) 117 mg/kg
LD50 (Subcutaneous-Mouse) 2210 mg/kg
TDLo (Intrauterine-Mouse) 84,800 mg/kg (4 days preg): Reproductive effects
LC50 (Inhalation-Rat) 2300 mg/m3/2 hours

PART IV Is there any other useful information about this material?
11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

<table>
<thead>
<tr>
<th>Sodium Carbonate, Soda Ash, Light (continued):</th>
</tr>
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<tbody>
<tr>
<td>LC50 (Inhalation-Mouse) 1200 mg/m³/2 hours</td>
</tr>
<tr>
<td>LC50 (Inhalation-Guinea Pig, Adult) 800 mg/m³/2 hours</td>
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</table>

<table>
<thead>
<tr>
<th>Sodium Carbonate, Soda Ash, Light (continued):</th>
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</thead>
<tbody>
<tr>
<td>TCLo (Inhalation-Species Unspecified) 16200 µg/m³/17 weeks-intermittent: Sense Organs and Special Senses (Olfaction): change in sensation of smell; Vascular: BP elevation not characterized in autonomic section; Lungs, Thorax, or Respiration: respiratory depression</td>
</tr>
</tbody>
</table>

SUSPECTED CANCER AGENT: None of the components of this product are found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, and therefore are neither considered to be nor suspected to be cancer causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is extremely irritating and corrosive to contaminated tissue.

SENSITIZATION OF PRODUCT: There is some evidence that the Sodium Percarbonate component may cause skin sensitization in susceptible individuals and allergic reaction. Symptoms can include itching, rash, or welts.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: The components of this product are not reported to produce mutagenic effects in humans.

Embryotoxicity: The components of this product are not reported to produce embryotoxic effects in humans.

Teratogenicity: The components of this product are not reported to cause teratogenic effects in humans.

Reproductive Toxicity: The components of this product are not reported to cause reproductive effects in humans.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational 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 components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product will decompose into other organic and inorganic compounds over time under normal environmental conditions. Additional environmental data are available as follows:

<table>
<thead>
<tr>
<th>Sodium Carbonate, Soda Ash, Light:</th>
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EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful to animal life if large volumes of it are released into the environment.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful to contaminated aquatic life (especially if large volumes of it are released into an aquatic environment.

13. DISPOSAL CONSIDERATIONS

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

EPA WASTE NUMBER: Solutions of this product should be tested for D002 (Waste Characteristic Corrosivity).

14. TRANSPORTATION INFORMATION

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

<table>
<thead>
<tr>
<th>Proper Shipping Name:</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Hazard Class Number and Description:</th>
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<tr>
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<table>
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<tr>
<th>UN Identification Number:</th>
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<th>DOT Label(s) Required:</th>
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<th>Packaging Group:</th>
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<tr>
<th>Marine Pollutant:</th>
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<tbody>
<tr>
<td>No component of this product is listed as a marine pollutant by the D.O.T. (49 CFR 172.101, Appendix B).</td>
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</table>

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<tr>
<th>Transport Canada Transportation of Dangerous Goods Regulations:</th>
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<tbody>
<tr>
<td>This product is not considered as dangerous goods, per Transport Canada regulations.</td>
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</table>
15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: No component of this product is subject to the reporting requirements of Sections 302, 304 and 313 of the Superfund Amendments and Reauthorization Act.

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

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

U.S. TSCA INVENTORY STATUS: All components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is listed on the California Proposition 65 lists. Trace materials in the product are on the California Proposition 65 Lists, including Dioxane and Ethylene Oxide. These materials are in less than 0.001%.

ANSI LABELING (Z129.1): WARNING! MAY BE FATAL IF SWALLOWED. MAY CAUSE RESPIRATORY SYSTEM, SKIN AND EYE IRRITATION. Do not taste or swallow. Avoid contact with skin and eyes. Avoid breathing dusts or particulates. Keep container closed. Use only with adequate ventilation. Wear gloves, goggles, and suitable body protection if necessary. FIRST-AID: In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention if any adverse effects occur. IN CASE OF FIRE: Use water fog, dry chemical, CO2, or “alcohol” foam. IN CASE OF SPILL: Sweep or vacuum spill, avoiding generation of dust, and place in suitable container. Consult Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:

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

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: Not applicable.

CANADIAN WHMIS SYMBOLS: Class D2B: Materials Causing Other Toxic Effects

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. PO Box 3519, La Mesa, CA 91944-3519 (800) 441-3365

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.

DFG MAK Germ Cell Mutagen Categories:
1: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. 2: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. 3A: Substances which have been shown to induce genetic damage in germ cells of human animals, or which produce mutagenic effects in somatic cells of mammals in vivo and have been shown to reach the germ cells in an active form. 3B: Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell in vivo; in exceptional cases, substances for which there are no in vivo data, but which are clearly mutagenic in vitro and structurally related to known in vivo mutagens.

EXPOSURE LIMITS IN AIR (continued):

DFG MAK Germ Cell Mutagen Categories (continued): 4: Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) 5: Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can cause damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed.
DEFINITIONS OF TERMS (Continued)

EXPOSURE LIMITS IN AIR (continued):

DFG MAK Pregnancy Risk Group Classification (continued): Group B: Currently available limited evidence of a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. Group C: There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. Group D: Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

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 to which nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour TWA exposure that should 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.

STEL–Short Term Exposure Limit: Usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday and the duration must be considered, including the 8-hour TWA exposure within the 8-hour or 10-hour TWA exposure. The Short Term Exposure Limit, usually a 15-minute TWA exposure for a period of 5 minutes.

TWA–Time Weighted Average: A time weighted average of exposure to a substance that can be applied over any period of time during a 24-hour period to the extent the substance is not noxious, irritant, or toxic. TWA must also be considered in conjunction with STEL.

TDI–Threshold Limit Value: Time weighted average concentration for 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 an 8-hour workday.

TWA–Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hour (TWA, PEL) or up to a 10-hour (REL) workday and a 40-hour 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. PII or Draize = “0”.

Eye Irritation: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation].

Eye 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: > 500-5000 mg/kg. Dermal Toxicity LD₅₀ Rat or Rabbit: > 1000-2000 mg/kg. Inhalation Toxicity LC₅₀ 4-hrs Rat or Rabbit: > 20-200 mg/L. 2 (Moderate Hazard): Temporary or transitory injury may occur. Skin Irritation: Moderately irritating; primary irritant; sensitizer. PII 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 > 0, < 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 or Rabbit: > 0.5-2 mg/L. 3 (Severe 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. PII or Draize > 5 with destruction of tissue. Eye Irritation: Corrosive, irreversible destruction of corneal 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 or Rabbit: > 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: < 0.015 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;
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

1. 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 an ignition temperature exceeding the ambient temperature. Division 1.4 – Non-division 1.2 explosives that have an ignition temperature below 550°F (288°C) at or above 10 mm Hg. Division 1.5 – Not otherwise divided materials that have an estimated instantaneous power density of greater than 500,000 watts/m² but less than or equal to 1,000,000 watts/m². Division 1.6 – Not otherwise divided materials 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: Yes. Other Materials: Division 2.1 – Flammable Materials: Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density of greater than 500,000 watts/m² but less than or equal to 1,000,000 watts/m². Division 2.2 – Electrical Conductors: Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density of greater than 500,000 watts/m² but less than or equal to 1,000,000 watts/m². Division 2.3 – Solid Substances: Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density of greater than 500,000 watts/m² but less than or equal to 1,000,000 watts/m². Division 2.4 – Liquefied Gases: Materials that, under emergency conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. 1 Materials that must be preheated before ignition can occur. Materials in this degree require considerably lower temperatures before the ignition temperature at which combustion and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not form flammable or combustible mixtures with air. Liquids having a flash point below 22°C (72°F) and a boiling point at or above 81°C (180°F) and those liquids having a flash point at or above 22°C (72°F) and below 81°C (180°F) but having a flash point below 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solids in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures with air. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 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, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22°C (72°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22°C (72°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (i.e. dry nitrocellulose and many organic peroxides). Materials containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. Liquid or gas materials that are liquid while under pressure and have a flash point below 22°C (72°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. INSTABILITY HAZARD. 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. 1 Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) or at above 0.01 W/mL and below 10 W/mL. Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 1000 W/mL. Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) or at above 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. Materials that in themselves are ready capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.
DEFINITIONS OF TERMS (Continued)

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:
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: 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. 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, LCo, 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 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. TLₐₐ = median threshold limit; Coefficient of Oil/Water Distribution is represented by log Koc or log Kow and is used to assess a substance’s behavior in the environment.

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: 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. 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, LCo, 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 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:
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.