

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, Australian Worksfe and European EC Directive Standards

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **AFFF 3% Foam Concentrate-PN#04426**
MANUFACTURER'S NAME: **AMEREX CORPORATION**
ADDRESS: P.O. BOX 81
Trussville, AL 35173-0081
1-800-424-9300 (**CHEMTREC**)
(205) 655-3271
3082
EMERGENCY PHONE:
BUSINESS PHONE:
U.N. NUMBER:
U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK: Class 9 (Miscellaneous Hazardous Substance)
HAZCHEM CODE (AUSTRALIA): 2X
POISONS SCHEDULE NUMBER (AUSTRALIA): Schedule 6
DATE OF PREPARATION: June 15, 1995
DATE OF REVISION: August 13, 2002

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS #	% w/w	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		
Perfuloroalkyl Sulfonate Salts	Proprietary		0.5-1.5	NE	NE	NE	NE	NE	NE
Amphoteric Fluoroalkylamide Derivative Alkyl Sulfate Salts Mixture	Proprietary		1-5	NE	NE	NE	NE	NE	NE
Triethanolamine	102-71-6	203-049-8	0.5-1.5	5	NE	NE	NE	NE	DFG MAK: Danger of Sensitization of the Skin Carcinogen: IARC-3
Diethylene Glycol Monobutyl Ether	112-34-5	203-961-6	19-21	NE	NE	NE	NE	NE	DFG MAKs: TWA = 100 PEAK = 1•MAK, 15 min., average value DFG MAK Pregnancy Risk Classification: C
Water	7732-18-5	Unlisted	69-71	NE	NE	NE	NE	NE	NE
Other 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).			Balance	None of the other constituents 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, Canadian Workplace Hazardous Materials Identification System Standards (CPR 4) and European Community Standards (Commission Directive 93/112/EEC), and applicable Australian regulations [NOHSC: 1005(1994)].					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): 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, EC Directives and WorkPlace Australia.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a clear amber, slightly basic solution with a faint odor characteristic of amines (ammonia-or fish-like). **Health Hazards:** This product may mildly to moderately contaminated tissue by inhalation skin or eye contact, depending on concentration and duration of exposure. May cause sensitization to the skin and allergic reaction in susceptible individuals, due to the presence of Triethanolamine. Inhalation of high concentrations may result in adverse effects on central nervous system. May be harmful or fatal if swallowed. **Flammability Hazard:** This product is not flammable. In the event of a fire, the components of this product may decompose to release smoke, irritating vapors and toxic gases (e.g., carbon dioxide, carbon monoxide, oxides of nitrogen, oxides of sulfur, and hydrogen fluoride). **Reactivity Hazard:** This product is not reactive. **Environmental Hazard:** Release of large quantities of this product to an aquatic or terrestrial environment may cause harm to plants and animals. **Emergency Response Considerations:** Emergency responders must wear personal protective equipment appropriate for the situation to which they are responding.

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

INHALATION: Inhalation of this product can cause mild to moderate irritation of the respiratory system, throat and nose, depending on duration and concentration of exposure. Symptoms may include coughing, sore throat and nasal passages, and sneezing. Inhalation of high concentration may result in depression of the central nervous system. Symptoms may include drowsiness, dizziness, confusion, incoordination, slurred speech, slowed reaction time and unconsciousness.



CONTACT WITH SKIN or EYES: Skin contact may cause mild to moderate irritation of skin tissues, depending on concentration and duration of exposure. Prolonged skin exposure may result in defatting of the skin and the development of dermatitis, with symptoms of dry, red, itchy skin. The Triethanolamine component of this product is a known skin sensitizer in humans and may cause allergic skin reaction in susceptible individuals. Symptoms can include rash, itching, swelling, blistering or welts. Once sensitized, exposure to a very small amount can cause allergic reaction. Contact with vapors of this product may cause moderate irritation. Direct contact with the liquid will cause immediate irritation, with tearing, pain, redness and swelling. Low concentration vapor contact with the eyes can lead to a visual disturbance known as "halo vision" or "blue haze". Symptoms include blurred or foggy vision, with objects appearing bluish, halos around lights and sensitivity to light. This condition may be delayed after exposure by several hours, but will normally end within several days.

SKIN ABSORPTION: The Triethanolamine, Perfluoroalkyl Sulfonate Salts and other organic fluorochemical components of this product can be absorbed via intact skin. The organic fluorochemical compounds have the potential to remain in the body for long periods of time, either as the original compound or as metabolites and may accumulate with repeated exposures. Currently, there are no data on the possible health consequences of accumulation of these compounds in the body. Some unsubstantiated animal studies of the effects of Triethanolamine by skin absorption indicate that damage to liver and kidneys may occur. The main health effect by skin absorption is allergic skin reaction is as described under "Contact with Skin or Eyes".

INGESTION: Ingestion is not anticipated to be a likely route of occupational exposure to this product. If ingestion does occur, irritation of the gastrointestinal system will occur. Symptoms can include nausea, vomiting, abdominal pain, blood in feces and blood in vomit. In addition, ingestion will result in effects on the central nervous system, as described under "Inhalation". A significant hazard associated with ingestion of this product is aspiration; breathing this material into the lungs can cause severe lung irritation and tissue damage, which can cause chemical pneumonia or pulmonary edema (life-threatening lung conditions). Animal ingestion studies involving organic fluorochemicals, such as are in this product, have resulted in symptoms of weight loss, loss of appetite, lethargy, and adverse effects on the liver, neurological system, pancreas, adrenal system, and blood system.

INJECTION: Though not anticipated to be a likely route of occupational exposure, injection of this material (via puncture or laceration by a contaminated object) may cause local reddening, tissue swelling, and discomfort in addition to the wound.

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

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD		(BLUE)	2
FLAMMABILITY HAZARD		(RED)	0
PHYSICAL HAZARD		(YELLOW)	0
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For Routine Industrial Use and Handling Applications			

See Section 16 for Definition of Ratings

ACUTE: This product may be mildly to moderately irritating to the skin or via inhalation, depending on concentration and duration of exposure. Eye contact will immediately irritate the eyes, with pain, tearing and redness. (continued on following page)

3. HAZARD IDENTIFICATION (Continued)

ACUTE (continued): Ingestion and inhalation exposure may cause adverse effects on the central nervous system. Eye contact with vapors can cause temporary disturbances in the vision and sensitivity to light. Ingestion will cause irritation of the gastrointestinal system, with symptoms of abdominal pain, vomiting, blood in vomit and feces and possible adverse effects on the adrenal system, liver, neurological system, pancreas and blood system (based on animal studies). Ingestion of large amounts of this product may be fatal. Aspiration of the product into the lungs after ingestion can result in severe damage to the respiratory system and may be fatal.

CHRONIC: This product contains a skin sensitizer, Triethanolamine, which can cause allergic skin reaction in susceptible individuals. Repeated skin contact may also cause dermatitis. Chronic inhalation exposure may cause damage to liver and kidneys.

TARGET ORGANS: ACUTE: Skin, respiratory system, eyes, gastrointestinal system, central nervous system, pancreas, neurological system, blood system. CHRONIC: Skin, liver, kidneys.

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 health professional with victim.

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

INHALATION: If vapors, mists, or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers. Seek medical attention if adverse effect occurs or continues.

EYE EXPOSURE: If this product's liquid or vapors 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. Do not allow victim to rub or keep eyes closed. Victim must seek immediate medical attention.

INGESTION: If this product is swallowed, **CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION.** **DO NOT INDUCE VOMITING** unless directed by medical personnel. Have victim rinse mouth with water. 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.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory or skin conditions or disorders involving the "Target Organs" (see Section 3, "Hazard Identification") may be aggravated by overexposure to vapors or mists of this product. Persons sensitive to pulmonary irritation upon exposure to high concentrations of mists or sprays should use appropriate engineering controls or respiratory protection when recharging fire extinguishers.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure. Provide oxygen, if necessary. Pulmonary function tests, chest X-rays, and nervous system evaluations may prove useful.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not flammable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: None. This product is a fire extinguishing agent. Use agent appropriate for surrounding area and materials involved.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce irritating fumes and toxic gases including carbon dioxide, carbon monoxide, oxides of nitrogen, oxides of sulfur, and hydrogen fluoride. This product contains a known skin sensitizer and so presents a contact hazard to fire-fighters.

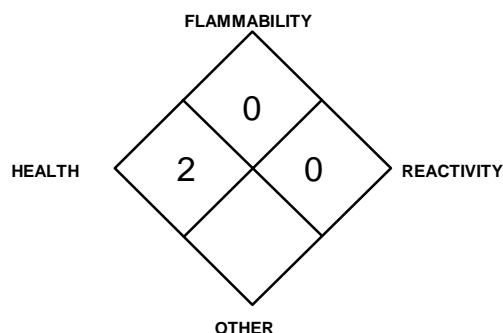
Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment.

Chemical resistant clothing may be necessary. Responders must ensure all persons in areas downwind of spill are protected from inhalation of acidic mist or vapors. Move containers from fire area if it can be done without risk to personnel. Water fog or spray can also be used by trained fire-fighters to disperse this product's vapors and to protect

NFPA RATING



**See Section 16 for
Definition of Ratings**

personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Monitor the area for vapors 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.

For small releases, clean up spilled liquid wearing gloves, goggles, faceshield, and suitable body protection. The minimum Personal Protective Equipment recommended for response to non-incident releases should be **Level C: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and air purifying respirator with an amine cartridge under a HEPA filter)**. Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with citric acid or other neutralizing agent for basic materials. Decontaminate the area thoroughly. Test area with litmus paper to ensure neutralization. Place all spill residue in a suitable container. Ensure the area is dry, to avoid slip hazards. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate standards of Canada, Australian Standards, or EC Member States (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 and launder before reuse.

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. Store below 49°C (120°F) and above 0°C (32°F). 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). Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Empty containers may contain residual liquid or vapors; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers which held this product.

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, if necessary. Collect all rinsates and dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate standards of Canada, standards of Australia or EC Member States

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.

INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS: In addition to the exposure limit values cited in Section 2 (Composition and Information on Ingredients), other exposure limits have been established by various countries for the components of this mixture, as provided below (no listing for a component indicates no values are available):

TRIETHANOLAMINE:

Denmark: TWA= 0.5 ppm (3.1 mg/m³), JAN 1999

Sweden: NGV = 5 mg/m³, KTV = 10 mg/m³ JAN 1999

RESPIRATORY PROTECTION: None needed under normal circumstances of use. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, and EC member states, or the Australian Standard 1716-Respiratory Protective Devices and Australian Standard 1715-Selection, Use, and Maintenance of Respiratory Protective Devices. 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 U.S. Federal OSHA's Respiratory Protection Standard (1910.134-1998) or the regulations of various U.S. States, Canada, Australia, or EC Member States.

HAND PROTECTION: Use neoprene or butyl gloves. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. Check gloves for leaks. If necessary, refer to U.S. OSHA 29 CFR 1910.138, Australian Standard 2161-Industrial Safety Gloves and Mittens and appropriate Standards of the EC and Canada for further information.

EYE PROTECTION: Splash goggles or safety glasses. A full face shield should be used when handling more than 1 gallon of material. If necessary, refer to U.S. OSHA 29 CFR 1910.133, the European Standard EN166, or the Australian Standard 1337-Eye Protection for Industrial Applications and Australian Standard 1336-Recommended Practices for Eye Protection in the Industrial Environment for further information.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

BODY PROTECTION: Use body protection appropriate for task. If necessary, refer to Australian Standard 3765-Clothing for Protection Against Hazardous Chemicals for further information. 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

VAPOR DENSITY @ 20°C: 0.77 (calculated)

SPECIFIC GRAVITY: Approximately 1.0.

SOLUBILITY IN WATER: Soluble.

VAPOR PRESSURE @ 20°C: 17.4 mmHg (calculated)

PERCENT VOLATILE: 90% by weight

APPEARANCE AND COLOR: This material is a clear, amber-colored liquid with a faint odor characteristic of amines (ammonia- or fish-like).

HOW TO DETECT THIS SUBSTANCE (warning properties): This product does not have any specific warning properties.

EVAPORATION RATE (n-BuAc=1): < 1

MELTING/FREEZING POINT: ~ 0°C (32°F)

BOILING POINT: ~ 100°C (212°F)

pH (1% solution): ~ 8.5

10. STABILITY and REACTIVITY

STABILITY: Stable under conditions of normal temperature and pressure.

DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides, hydrogen fluoride.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is not compatible with strong acids, strong bases, and strong oxidizing agents under some conditions.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures, incompatible chemicals.

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following data are available for components of this product greater than 1 percent by weight in concentration.

DIETHYLENE GLYCOL MONOBUTYL ETHER:

Standard Draize Test (Skin-Rabbit) 20 mg: Severe

Standard Draize Test (Eye-Rabbit) Moderate

LD₅₀ (Oral-Rat) 5660 mg/kg

LD₅₀ (Oral-Mouse) 2400 mg/kg

LD₅₀ (Oral-Rabbit) 2200 mg/kg

LD₅₀ (Oral-Guinea Pig) 2 gm/kg: Behavioral: general anesthetic; Gastrointestinal: other changes; Kidney, Ureter, Bladder: other changes

LD₅₀ (Intraperitoneal-Mouse) 850 mg/kg: Lungs, Thorax, or Respiration: other changes; Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Blood: changes in spleen

LD₅₀ (Unreported-Rat) 4500 mg/kg

LD₅₀ (Unreported-Mouse) 6050 mg/kg

LD₅₀ (Skin-Rabbit) 2700 mg/kg

TDLo (Oral-Rat) 83 gm/kg/13 weeks-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: death

TDLo (Oral-Rat) 109 gm/kg/6 weeks-intermittent: Behavioral: food intake (animal); Blood: pigmented or nucleated red blood cells; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TCLo (Inhalation-Rat) 5 mg/m³/24 hours/17 weeks-continuous: Brain and Coverings: recordings from specific areas of CNS; Blood: other changes

TRIETHANOLAMINE:

Standard Draize Test (Skin-Human) 15 mg/3 days-intermittent: Mild

TRIETHANOLAMINE (continued):

Standard Draize Test (Skin-Rabbit) 560 mg/24 hours: Mild

Standard Draize Test (Eye-Rabbit) 20 mg: Severe

Standard Draize Test (Eye-Rabbit) 10 mg: Mild

LD₅₀ (Oral-Rat) 4920 µL/kg: Sense Organs and Special Senses (Eye): lacrimation; Gastrointestinal: hypermotility, diarrhea; Skin and Appendages: hair

LD₅₀ (Oral-Rabbit) 2200 mg/kg

LD₅₀ (Oral-Mouse) 5846 mg/kg: Behavioral: convulsions or effect on seizure threshold; Gastrointestinal: hypermotility, diarrhea;

Kidney, Ureter, Bladder: other changes

LD₅₀ (Oral-Guinea Pig) 2200 mg/kg

LD₅₀ (Skin-Rat) > 16 mL/kg

LD₅₀ (Skin-Rabbit) > 20 mL/kg

LD₅₀ (Intraperitoneal-Rat) 1510 mg/kg

LD₅₀ (Intraperitoneal-Mouse) 1450 mg/kg

LDLo (Oral-Mammal-species unspecified) 2 gm/kg

TCLo (Inhalation-Rat) 2 gm/m³/6 hours/3 weeks-intermittent: Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in bladder weight; Endocrine: changes in thymus weight

TCLo (Inhalation-Mouse) 125 mg/m³/6 hours/3 weeks-intermittent: Cardiac: changes in heart weight; Blood: pigmented or nucleated red blood cells, changes in erythrocyte (RBC) count

TDLo (Oral-Rat) 63,028 mg/kg/28 days-continuous: Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in bladder weight; Related to Chronic Data: changes in testicular weight

TRIETHANOLAMINE (continued):

TDLo (Oral-Rat) 96 gm/kg/60 days-intermittent: Kidney, Ureter, Bladder: other changes

TDLo (Oral-Rat) 29,700 µg/kg/90 days-continuous: Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in bladder weight

TDLo (Skin-Rat) 65 gm/kg/13 weeks-intermittent: Kidney, Ureter, Bladder: changes in kidney weight; Skin and Appendages: dermatitis, other (after systemic exposure); Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Mouse) 2296 mL/kg/82 weeks-continuous: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Guinea Pig) 192 gm/kg/17 weeks-intermittent: Liver: other changes; Kidney, Ureter, Bladder: other changes

TDLo (Skin-Mouse) 260 gm/kg/13 weeks-intermittent: Liver: changes in liver weight; Kidney, Ureter, Bladder: changes in kidney weight; Skin and Appendages: dermatitis, other (after systemic exposure)

TDLo (Skin-Guinea Pig) 32 gm/kg/4 days-intermittent: Related to Chronic Data: death

TDLo (Skin-Rat) 129 gm/kg/2 years-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Kidney, Ureter, Bladder: tumors

Cytogenetic Analysis (Human-Lymphocyte) 100 µmol/L

Sister Chromatid Exchange (Human-Lymphocyte) 1 mmol/L

11. TOXICOLOGICAL INFORMATION (Continued)

SUSPECTED CANCER AGENT: The components of this product are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

TRIETHANOLAMINE: IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

The remaining components of this product are not found on the following lists: U.S. FEDERAL OSHA Z LIST, NTP, IARC, and 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 severely irritating and corrosive to contaminated tissue.

SENSITIZATION TO THE PRODUCT: Low level concentration exposure to this product may result in allergic reaction in susceptible individuals.

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 known to cause mutagenic effects.

Teratogenicity: The components of this product are not known to cause teratogenic effects.

Reproductive Toxicity: The components of this product are not known to cause reproductive toxicity effects.

A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. A *teratogen* is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) have not been determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: Environmental stability data on this product and also on several components of the product is presented below.

PRODUCT:

5-Day Biochemical Oxygen Demand (BOD5): 0.35 g/g; 20 Day Biochemical Oxygen Demand (BOD20): 0.75 g/g; Chemical Oxygen Demand (COD): 0.75 g/g; 20-Day BOD/COD: 0.96; LC₅₀ (activated sludge respiration) 3 hours = > 1000 mg/L @ 20°C

DIETHYLENE GLYCOL MONOBUTYL ETHER:

Terrestrial Fate: Based on a recommended classification scheme, an estimated Koc value of 50, determined from a measured log Kow and a recommended regression-derived equation, indicates that Diethylene Glycol Monobutyl Ether will have high to very high mobility in soil. Volatilization of Diethylene Glycol Monobutyl Ether is not expected to be important from moist soil surfaces given an estimated Henry's Law constant of 1.3X10⁻⁸ atm-cu m/mole, calculated from experimental values for vapor pressure and water solubility. Significant volatilization from dry soil surfaces is not expected based on a measured vapor pressure of 0.06 mm Hg. Alcohols and ethers are generally resistant to hydrolysis. They do not absorb UV light in the environmentally significant range, > 290 nm and are commonly used as solvents for obtaining UV spectra. Therefore, Diethylene Glycol Monobutyl Ether should not undergo hydrolysis in moist terrestrial environments, or direct photolysis on sunlit soil surfaces. Aqueous screening test data suggest that biodegradation may be an important removal mechanism of Diethylene Glycol Monobutyl Ether from aerobic soil; greater than 80-90% degradation was reported in 28 days.

Aquatic Fate: Based on a recommended classification scheme, an estimated Koc value of 50, determined from a measured log Kow and a recommended regression-derived equation, indicates that Diethylene Glycol Monobutyl Ether should not adsorb to suspended solids and sediment in water. Diethylene Glycol Monobutyl Ether is not expected to volatilize from water surfaces based on an estimated Henry's Law constant of 1.3X10⁻⁸ atm-cu m/mole, calculated from experimental values for vapor pressure and water solubility. According to a classification scheme, an estimated BCF value of 2, from a measured log Kow, suggests that bioconcentration in aquatic organisms is low. Alcohols and ethers are generally resistant to hydrolysis. These functional groups do not absorb UV light in the environmentally significant range (>290 nm) and are commonly used as solvents for obtaining UV spectra. Therefore, Diethylene Glycol Monobutyl Ether should not undergo hydrolysis or direct photolysis in aquatic environments. Aqueous screening test data suggest that aerobic biodegradation may be an important removal mechanism of Diethylene Glycol Monobutyl Ether from aquatic systems; greater than 80-90% degradation was reported in 28 days.

Atmospheric Fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere, Diethylene Glycol Monobutyl Ether, which has a measured vapor pressure of 0.06 mm Hg at 25°C, will exist solely as a vapor in the ambient atmosphere. Vapor-phase Diethylene Glycol Monobutyl Ether is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 10 hours. Alcohols and ethers do not absorb UV light in the environmentally significant range (> 290 nm) and are commonly used as solvents for obtaining UV spectra. Therefore, Diethylene Glycol Monobutyl Ether should not undergo direct photolysis in the atmosphere.

Bioconcentration: An estimated BCF value of 2 was calculated for Diethylene Glycol Monobutyl Ether using a measured log Kow of 0.56 and a recommended regression-derived equation. According to a classification scheme, this BCF value suggests that bioconcentration in aquatic organisms is low.

TRIETHANOLAMINE:

Terrestrial Fate: If released to soil, Triethanolamine is expected to biodegrade fairly rapidly following acclimation (half-life on the order of days to weeks). Residual Triethanolamine may leach. Volatilization from soil is not expected to be an important fate process.

Aquatic Fate: If released to water, Triethanolamine should biodegrade. The half-life of this compound is expected to range from a few days to a few weeks depending, in large part, on the degree of acclimation of the system. Bioconcentration in aquatic organisms, adsorption to suspended solids and sediments, and volatilization are not expected to be important fate processes in water.

Atmospheric Fate: Based on a vapor of 3.59X10⁻⁶ mm Hg at 25°C, Triethanolamine is expected to exist partly in the vapor phase and partly adsorbed to particulates in the atmosphere. Triethanolamine vapor is expected to react with photochemically generated hydroxyl radicals in the atmosphere (estimated half-life 4 hours). The complete miscibility of Triethanolamine in water suggests that this compound may also be removed from the atmosphere in precipitation. Dry deposition may be an important removal process for Triethanolamine adsorbed on particles.

Bioconcentration: A bioconcentration factor (BCF) of < 1 was estimated for Triethanolamine based on a log Kow of -1.59. An experimentally determined BCF was < 3.9. These BCF values and the complete solubility of Triethanolamine in water suggest that this compound does not bioconcentrate in aquatic organisms.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Discharge of this product may have a detrimental effects on contaminated plants and animals.

12. ECOLOGICAL INFORMATION (Continued)

EFFECT OF CHEMICAL ON AQUATIC LIFE: If a large quantity is released to an aquatic environment, damage to plants and animals may occur. The following are aquatic data for the product and for some components of this product.

PRODUCT:

LC₅₀ (*Pimephales promelas* fathead minnow) 96 hours = > 1000 mg/L

EC₅₀ (*Daphnia magna* water flea) 48 hours = > 1000 mg/L

EC₅₀ (*Selenastrum capricornutum* algae) 96 hours = 143 mg/L

EC₅₀ (*Photobacterium phosphoreum*) 30 minutes = 280 mg/L

DIETHYLENE GLYCOL MONOBUTYL ETHER:

EC₀ (*Pseudomonas putida* bacteria) 16 hours = 255 mg/L

EC₀ (*Microcystis aeruginosa* algae) 8 days = 53 mg/L

EC₀ (*Scenedesmus quadricauda* green algae) 7 days = 1,000 mg/L

EC₀ (*Entosiphon sulcatum* protozoa) 72 hours = 73 mg/L

EC₀ (*Uronema parduczi* Chatton-Lwoff protozoa) = 420 mg/L

LC₅₀ (goldfish) 24 hours = 2,700 mg/L

LC_{0,S} (*Lepomis macrochirus*) 24 hours = 1,800 mg/L

LC_{0,S} (*Lepomis macrochirus*) 48 hours = 1,800 mg/L

LC_{0,S} (*Lepomis macrochirus*) 72 hours = 100 mg/L

LC_{0,S} (*Lepomis macrochirus*) 96 hours = 100 mg/L

LC_{50,S} (*Lepomis macrochirus*) 24 hours = 2,400 mg/L

LC_{50,S} (*Lepomis macrochirus*) 48 hours = 2,400 mg/L

LC_{50,S} (*Lepomis macrochirus*) 72 hours = 2,400 mg/L

LC_{50,S} (*Lepomis macrochirus*) 96 hours = 1,300 mg/L

LC_{100,S} (*Lepomis macrochirus*) 48 hours = 3,200 mg/L

LC_{0,S} (*Menidia beryllina*) 24-48 hours = 2,400 mg/L

LC_{0,S} (*Menidia beryllina*) 72 hours = 1,800 mg/L

LC_{50,S} (*Menidia beryllina*) 96 hours = 2,400 mg/L

LC_{0,S} (*Menidia beryllina*) 72 hours = 1,000 mg/L

LC_{50,S} (*Menidia beryllina*) 96 hours = 2,400 mg/L

LC₅₀ (*Menidia beryllina*) 96 hours = 2,000 mg/L

TRIETHANOLAMINE:

LC₀ (*Scenedesmus*) = 100 mg/L

TRIETHANOLAMINE (continued):

LC₀ (Colpoda) = 160 mg/L

LC₀ (*Daphnia*) = 2,500 mg/L

LC₅₀ (*Pimephales promelas* fathead minnow) 96 hours = 11.8 mg/L (95% confidence limit 10.6 - 13.0 mg/L), flow-through bioassay with measured concentrations, 25.7 deg C, dissolved oxygen 7.3 mg/l, and pH 7.8

LC₅₀ (*Artemia salina*) 24 hours = 5,600 mg/L

LC₅₀ (*Carassius auratus*) 24 hours = > 5,000 mg/L

LC₅₀ (*Leuciscus idus*) 48 hours = > 10,000 mg/L

LC₁₀₀ (*Pseudomonas putida*) 72 hours = 5,000 mg/L

EC₀ (*Photobacterium*) 30 minutes = 140 mg/L (not neutralized)

EC₀ (*Pseudomonas putida*) 17 hours = > 10,000 mg/L

EC₀ (*Microcystis aeruginosa*) 8 days = 47 mg/L

EC₀ (*Microcystis aeruginosa*) 8 days = 19 mg/L

EC₀ (*Scenedesmus quadricauda*) 8 days = 1.8 mg/L

EC₀ (*Scenedesmus quadricauda*) 8 days = 715 mg/L

EC₀ (*Entosiphon sulcatum*) 72 hours = 56 mg/L

EC₀ (*Uronema parduczi* Chatton-Lwoff) = > 10,000 mg/L

EC₀ (*Daphnia magna* Straus) 24 hours = 875; 1,386; 1,530 mg/L

EC₁₀ (*phosphoreum*) 30 minutes = 3,154 mg/L (neutralized)

EC₁₀ (*Scenedesmus subspicatus*) 72 hours = 7.9; 26 mg/L

EC₁₀ (*Scenedesmus subspicatus*) 48 hours = 62; 110 mg/L

EC₅₀ (*phosphoreum*) 30 minutes = 525 mg/L (not neutralized)

EC₅₀ (*phosphoreum*) 30 minutes = 38,400 mg/L (neutralized)

EC₅₀ (*Scenedesmus subspicatus*) 72 hours = 216; 512 mg/L

EC₅₀ (*Scenedesmus subspicatus*) 48 hours = 470; 750 mg/L

EC₅₀ (*Daphnia magna* Straus) 24 hours = 1,360; 1,850; 2,038 mg/L

EC₇₅ (*Pseudomonas putida*) 7 days = 1,000 mg/L

NOEC (*Daphnia magna* Straus) 21 days = 16 mg/L

13. DISPOSAL CONSIDERATIONS

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

EPA WASTE NUMBER: Not applicable.

14. TRANSPORTATION INFORMATION

THIS PRODUCT IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)

UN IDENTIFICATION NUMBER: UN 3082

PACKING GROUP: III

DOT LABEL(S) REQUIRED: Class 9

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 171

MARINE POLLUTANT: The components of this product are not classified by the DOT as a Marine Pollutant (as defined by 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.

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)

UN IDENTIFICATION NUMBER: UN 3082

HAZARD LABEL(S) REQUIRED: Class 9

PACKING GROUP: III

SPECIAL PROVISIONS: 16

EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX: 5

ERAP INDEX: None

PASSENGER CARRYING SHIP INDEX: None

PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX: None

MARINE POLLUTANT: No component of this product is designated by the TDG Act to be Marine Pollutants.

14. TRANSPORTATION INFORMATION (Continued)

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is considered as dangerous goods, per the International Air Transport Association.

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)

UN IDENTIFICATION NUMBER: UN 3082

HAZARD LABEL(S) REQUIRED: Class 9

PACKING GROUP: III

ERG CODE: 9L

The following Packaging Information is applicable to this product:

PASSENGER AND CARGO AIRCRAFT				CARGO AIRCRAFT ONLY	
Limited Quantity		Packing Instruction	Max. Qty per Pkg	Packing Instruction	Max. Qty per Pkg
Packing Instruction	Max. Qty per Pkg				
Y914	30 kg	914	No Limit	914	No Limit

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is considered as dangerous goods, per the International Maritime Organization.

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)

UN IDENTIFICATION NUMBER: UN 3082

HAZARD LABEL(S) REQUIRED: Class 9

PACKING GROUP: III

STOWAGE: Category A

MARINE POLLUTANT: The components of this product are not designated by the IMO to be Marine Pollutants.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is considered by the Economic Commission for Europe to be dangerous goods. Additional information is as follows:

UN NO.: 3082

NAME & DESCRIPTION: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

CLASSIFICATION CODE: M6

PACKING GROUP: III

LABELS: 9

HAZARD IDENTIFICATION NUMBER: 90

AUSTRALIAN FEDERAL OFFICE OF ROAD SAFETY CODE FOR THE TRANSPORTATION OF DANGEROUS GOODS BY ROAD OR RAIL: This product is considered as Dangerous Goods, per regulations of the Australian Federal Office of Road Safety. Shipping information is as follows:

UN IDENTIFICATION NUMBER: UN 3082

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s. (Diethylene Glycol Monobutyl Ether, Alkyl Sulfate Salts)

HAZARD CLASS NUMBER and DESCRIPTION: 9 (Miscellaneous Hazardous Material)

PACKING GROUP: III

HAZCHEM CODE: 2X

SPECIAL PROVISIONS: SP 179, SP 274

PACKAGING METHOD: 3.8.9

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Diethylene Glycol Monobutyl Ether (in generic Glycol Ether category)	No	Yes	N230

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for Argon. 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. TSCA INVENTORY STATUS: Components of this product are listed on the TSCA Inventory.

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

U.S. CERCLA REPORTABLE QUANTITIES (RQ): Under the generic Glycol Ether Category, Diethylene Glycol Monobutyl Ether is a CERCLA Hazardous Substance, although no specific RQ has been assigned to the broad class.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: Chemicals in this product are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: None.

California - Permissible Exposure Limits for Contaminants: None.

Florida - Substance List: Triethanolamine.

Illinois - Toxic Substance List: None.

Kansas - Section 302/313 List: None.

Massachusetts - Substance List: Triethanolamine.

Michigan - Critical Materials Register: None.

Minnesota - List of Hazardous Substances: None.

Missouri - Employer Information/Toxic Substance List: None.

New Jersey - Right to Know Hazardous Substance List: None.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.

Pennsylvania - Hazardous Substance List: None.

Rhode Island - Hazardous Substance List: Triethanolamine.

Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance List: None.

Wisconsin - Toxic and Hazardous Substances: None.

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

ANSI LABELING [Z129.1] (Precautionary Statements): **CAUTION!** MAY CAUSE RESPIRATORY, SKIN AND EYE IRRITATION. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS BY INHALATION OR INGESTION. MAY CAUSE ALLERGIC SKIN REACTION IN SUSCEPTIBLE INDIVIDUALS. INGESTION MAY BE HARMFUL OR FATAL. FOR INDUSTRIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN. Use with adequate ventilation. Keep away from heat, sparks, or open flame. Avoid contact of liquid with skin, eyes, and clothing. Avoid exposure to vapors, mists, or sprays. Wash thoroughly after handling. Wear appropriate hand and eye protection. **FIRST-AID:** In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. If inhaled, remove to fresh air. If swallowed, do not induce vomiting. Get medical attention if irritation develops or persists or if any other adverse effect occurs. **IN CASE OF FIRE:** This product will not contribute to the intensity of a fire. Use fire-extinguishing material appropriate for surrounding materials. **IN CASE OF SPILL:** Absorb spill with inert materials (e.g., polypads, dry sand). Rinse area with soapy water. Consult Material Safety Data Sheet for additional information.

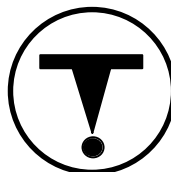
ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL 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: The components of this product are not on the CEPA Priority Substances Lists.

CANADIAN WHMIS SYMBOLS: **Class D2B:** Materials Causing Other Toxic Effects-Chronic Toxic Effects-Sensitization



EUROPEAN COMMUNITY INFORMATION:

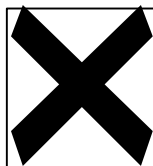
EC LABELING/CLASSIFICATION: This product is considered to be dangerous according to current European Community Guidelines. This product meets the definition of EC hazard class Xn (Harmful).

EC CLASSIFICATION: Xn

EC RISK PHRASES: Harmful by inhalation and in contact with skin. May cause sensitization by skin contact. [R: 20/21-43]

EC SAFETY PHRASES: Keep out of reach of children.* Do not breathe vapour or spray. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face protection. [S:(2)* 23, 26, 37/39] *This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.

EUROPEAN COMMUNITY ANNEX II HAZARD SYMBOL: Xn



15. REGULATORY INFORMATION (Continued)

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: The components of this product are listed on the AICS.

LIST OF DESIGNATED SUBSTANCES: Not applicable.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Schedule 6

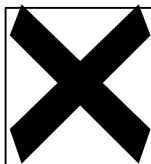
LABELING AND CLASSIFICATION: The following hazard classification data have been selected, based a review of the regulation [NOHSC: 10005 (1994)]:

CLASSIFICATION: Harmful. [Xn].

RISK PHRASES: Harmful by inhalation and in contact with skin. May cause sensitization by skin contact. [R: 20/21-43]

SAFETY PHRASES: Keep out of reach of children.* Do not breathe vapour/spray. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face protection. [S:(2-)* 23, 26, 37/39] *This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.

HAZARD SYMBOL:



16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AMEREX Corporation assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AMEREX Corporation assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

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.

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.

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.

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]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat 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 LD₅₀Rat 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. 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 LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 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 LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L.);

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS (continued):

HEALTH HAZARD (continued):

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. PII 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 LD₅₀Rat 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 LD₅₀Rat 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 IIIB, 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] Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); **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 IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable 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.);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

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 inhibitors.); **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:* Packing 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 chlorate 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:* Packing 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 perchloric 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.

DEFINITIONS OF TERMS (Continued)

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".

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**, **LCLo**, 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. **TL_m** = 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.

FIRE EXTINGUISHER
Cautions and Warnings

Fire extinguishers are designed and produced for the specific purpose of providing a safe and efficient safety tool to be used only in the fighting of fires. Improper or careless use may cause severe bodily injury and/or property damage.

Contents are under pressure which is necessary to deliver the contained extinguishing agent to the fire source. Please take note of the following safety information:

- Contents are under pressure. Do not puncture, incinerate, or discharge into another person's face.
- Do not store at high temperatures above or 49°C (120°F).
- Keep away from small children.
- Do not use if the extinguisher appears to be damaged or corroded.
- Avoid inhaling the extinguishing agent. Avoid inhaling smoke and fumes - all fires release toxic substances that are harmful. DO NOT remain in a closed area after use; evacuate the area immediately and ventilate thoroughly before re-entering.
- Although extinguishing agents are non-toxic when used properly, contact with them may cause irritation to eyes, nose, throat, and other allergic symptoms.

Refer to specific extinguishing agent Material Safety Data Sheet for additional information.

**AVOID INHALING SMOKE AND FUMES; ALL FIRES RELEASE TOXIC
SUBSTANCES THAT ARE HARMFUL. DO NOT REMAIN IN CLOSED
AREA AFTER USE. VENTILATE CLOSED AREAS BEFORE RETURNING.**