

MATERIAL SAFETY DATA SHEET

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

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

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): JAX GREEN PATINA
CHEMICAL NAME/CLASS: Not Applicable
SYNONYMS: Not Applicable
PRODUCT USE: Jewelry Plating
SUPPLIER/MANUFACTURER'S NAME: JAX CHEMICAL COMPANY
CHEMTREC EMERGENCY NO.: 1-800-424-9300 (United States)
 1-202-483-7616 (International Collect)
DATE OF PREPARATION: May 28, 1993
DATE OF REVISION: January 10, 2001

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		
Copper Sulfate Exposure limits are for Copper, dusts & mists, as Cu	7758-98-7	231-847-6	10-14%	1	NE	1	NE	100 (as Cu)	NIOSH REL: TWA = 1 DFG MAKs: TWA = 1 (inhalable fraction) PEAK = 2•MAK, 30 min., average value Carcinogen: EPA-D
Ammonium Chloride Exposure limits are for Ammonium Chloride, fume	12125-02-9	235-186-4	4-8%	10	20	10 (Vacated 1989 PEL)	20 (Vacated 1989 PEL)	NE	NIOSH RELs: TWA = 10 STEL = 20
Water and other components which 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 components contribute significant additional hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards; Canadian Workplace Hazardous Materials Identification System Standards (CPR 4); and the applicable Council Directives of the European Community.					

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, and EC Directives.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a light blue, odorless liquid. **Health Hazards:** Exposure of this product may mildly to moderately irritate the skin, eyes, and respiratory system, depending on the duration and concentration of exposure. **Flammability Hazards:** This product is not flammable. When involved in a fire, thermal decomposition of this product produces irritating vapors and toxic gases (e.g., copper oxides and ammonium oxides). **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** Releases of this product can cause harm to the environment, due to the presence of Copper Sulfate. **Emergency Recommendations:** Emergency responders must wear proper personal protective equipment for the releases 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 low levels of vapors, mists, or sprays of this solution are inhaled, irritation of the mucus membranes, coughing, nasal congestion, and a sore throat may occur. Inhalation of higher levels of the product may cause moderate irritation to the respiratory system. Symptoms should be relieved when victim is removed to fresh air.

CONTACT WITH SKIN or EYES: Depending on the duration of skin contact, skin overexposures may cause redness, discomfort, mild to moderate irritation. Repeated skin overexposures to this product may cause dermatitis (dry, red skin). Direct eye contact with the liquid can cause stinging, tearing, and redness. Severe eye overexposures may cause burns, pain, reddening, watering.

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

INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, irritation of the mouth, throat, esophagus and other tissues of the digestive system can occur. Ingestion of small amount of this product may cause mild metabolic acidosis.

Larger doses may cause severe metabolic acidosis with symptoms such as headache, drowsiness, vomiting and confusion. Chronic ingestion of low levels of copper compounds can result in "Wilson's Disease", a form of induced blood anemia in susceptible individuals. Ingestion of large volumes of this product may be fatal.

INJECTION: Accidental injection of this product can cause burning, reddening, and swelling in addition to the wound.

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

ACUTE: Inhalation exposure may cause coughing, sneezing, and difficulty breathing. Depending on the duration of contact, overexposures can mildly irritate tissues of the eyes, skin, mucous membranes and any other contaminated tissue. Ingestion may cause stomach pains, cramps, irritation, and mild to severe systemic acidosis, depending on the quantity ingested.

CHRONIC: Prolonged or repeated skin overexposure to this product may cause dermatitis (dry, red skin). Prolonged inhalation of vapors or mists generated by this product may cause respiratory disorders (e.g., bronchitis). Chronic ingestion or inhalation of this product can lead to blood anemia in susceptible individuals. Refer to Section 11 (Toxicology Information) for additional information on this product's components.

TARGET ORGANS: **Acute:** Skin, eyes, respiratory system. **Chronic:** Skin, blood system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

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

For routine industrial use.

See Section 16 for Definition of Ratings

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

4. FIRST-AID MEASURES

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

SKIN EXPOSURE: If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim should seek immediate medical attention if any adverse exposure symptoms develop.

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. Victim must seek medical attention.

4. FIRST-AID MEASURES (Continued)

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.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING unless direct by medical personnel. Have victim rinse mouth with water, if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention. **MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**: Preexisting dermatitis, other skin conditions, and respiratory conditions may be aggravated by exposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

NFPA RATING

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %): **Lower**: Not applicable.
Upper: Not applicable.

FLAMMABILITY

REACTIVITY

OTHER

FIRE EXTINGUISHING MATERIALS: This material will not contribute 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

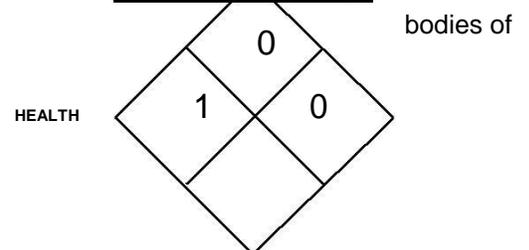
UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this product may decompose and produce irritating fumes and toxic gases (e.g., copper oxides and ammonium oxides).

Explosion Sensitivity to Mechanical Impact: Not applicable.

Explosion Sensitivity to Static Discharge: Not applicable.

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

**See Section 16 for
Definition of Ratings**



6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK 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. Releases of this material may be slippery. In the event of an incidental release of this product, personnel should wear gloves and safety glasses (or goggles). In the event of a non-incidental release, Minimum Personal Protective Equipment should be

Level C: triple-gloves, chemical resistant apron, boots, and splash goggles and an Air-Purifying respirator with organic vapor cartridge. Level B, which includes the use of Self-Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown. Absorb spilled liquid with polypads or other suitable absorbent materials. Decontaminate the area thoroughly. Prevent spill rinsates from contaminating storm drains, sewers, soil and groundwater. Place all spill residues in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada, and those of member states of the European Economic Community (see Section 13, Disposal Considerations).

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

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid generating mists and sprays of this product. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Open containers carefully on a stable surface. Empty containers may contain residual liquid; therefore, empty containers

should be handled with care. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Storage areas should be made of fire-resistant materials. Keep container tightly closed when not in use. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

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 if necessary. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or appropriate Canadian standards and those of member states of the European Economic Community.

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). Ensure eyewash/safety shower stations are available near areas where this product is used.

INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS: Currently, the following international exposure limits are in place for products of this product:

AMMONIUM CHLORIDE:

ARAB Republic of Egypt: TWA = 10 mg/m³ (fume) JAN 1993
Australia: TWA = 10 mg/m³; STEL = 20 mg/m³ (fume) JAN 1993
Belgium: TWA = 10 mg/m³; STEL = 20 mg/m³ (fume) JAN 1993
Denmark: TWA = 10 mg/m³, JAN 1999
The Netherlands: TWA = 10 mg/m³ (fume) JAN 1993
Russia: STEL = 10 mg/m³ (fume) JAN 1993
Switzerland: TWA = 6 mg/m³ (fume) JAN 1993
United Kingdom: TWA = 10 mg/m³; STEL = 20 mg/m³ (fume) JAN 1993
Poland: TWA = 10 mg/m³, STEL = 20 mg/m³ (vapors and fumes), JAN 1999
In Bulgaria, Colombia, Jordan, Korea, New Zealand, Singapore, Vietnam check ACGIH TLV

COPPER SULFATE:

Arab Republic of Egypt: TWA = 0.1 mg(Cu)/m³ (fume), JAN 1993

COPPER SULFATE (continued):

Australia: TWA = 0.2 mg(Cu)/m³ (fume), JAN 1993
Australia: TWA = 1 mg(Cu)/m³ (dust), JAN 1993
Belgium: TWA = 0.2 mg(Cu)/m³ (fume), JAN 1993
Belgium: TWA = 1 mg(Cu)/m³ (dust), JAN 1993
Finland: TWA = 0.2 mg(Cu)/m³ (fume), JAN 1999
Finland: TWA = 1 mg(Cu)/m³ (dust), JAN 1999
France: VME = 0.2 mg(Cu)/m³ (fume), JAN 1993
France: VME = 1 mg(Cu)/m³, STEL = 2 mg(Cu)/m³ (dust), JAN 1993
Germany: MAK = 0.1 mg(Cu)/m³ (fume), JAN 1999
Germany: MAK = 1 mg(Cu)/m³ (dust), JAN 1999
Hungary: TWA = 0.2 mg(Cu)/m³, STEL = 0.4 mg(Cu)/m³ (dust), JAN 1993
India: TWA = 0.2 mg(Cu)/m³ (fume), JAN 1993
The Netherlands: MAC-TGG = 0.2 mg(Cu)/m³ (fume), JAN 1999
The Netherlands: MAC-TGG = 1 mg(Cu)/m³ (dust), JAN 1999

COPPER SULFATE (continued):

The Philippines: TWA = 1.0 mg(Cu)/m³ (fume), JAN 1993
Russia: STEL = 0.5 mg/m³, JAN 1993
Russia: STEL = 0.5 ppm (1 mg(Cu)/m³) (dust), JAN 1993
Sweden: NGV = 0.2 mg(Cu)/m³ (resp. dust), JAN 1999
Sweden: NGV = 1 mg(Cu)/m³ (total dust), JAN 1999
Switzerland: TWA = 0.1 mg(Cu)/m³, STEL = 0.2 mg(Cu)/m³ (fume), JAN 1999
Switzerland: TWA = 1 mg(Cu)/m³, STEL = 1 mg(Cu)/m³, JAN 1999
Thailand: TWA = 0.1 mg(Cu)/m³ (fume), JAN 1993
Thailand: TWA = 1 mg(Cu)/m³, JAN 1993
United Kingdom: LTEL = 0.2 mg(Cu)/m³ (fume), JAN 1993
United Kingdom: LTEL = 1 mg(Cu)/m³, JAN 1993

RESPIRATORY PROTECTION: None needed under normal conditions of use. Use NIOSH approved respirators if ventilation is inadequate to control mists. Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, 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, or EC member states. 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: Splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, or the European Standard EN166.

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

BODY PROTECTION: Use body protection appropriate for task. If necessary, refer to appropriate Standards of Canada or the European Economic Community. 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, as described in U.S. OSHA 29 CFR 1910.136.

HMIS PERSONAL PROTECTIVE EQUIPMENT RATING: C (Safety glasses, gloves, apron)

9. PHYSICAL and CHEMICAL PROPERTIES

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

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

SPECIFIC GRAVITY: 1.05

MELTING/FREEZING POINT: > 0°C (32°F)

SOLUBILITY IN WATER: Soluble.

BOILING POINT: > 100°C (> 212°F)

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

pH: 3.3

ODOR THRESHOLD: Not applicable.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not available.

APPEARANCE, ODOR AND COLOR: This product is a blue, odorless liquid.

HOW TO DETECT THIS SUBSTANCE (warning properties): The color may act as a warning property associated with this product in the event of an accidental release.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product may generate copper oxides and ammonium oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong bases, oxidizers, reducing materials, and water reactive materials. Ammonium Chloride is incompatible with ammonium nitrate and potassium chlorate, alkalis and their carbonates, lead and silver salts. Copper Sulfate is incompatible with acetylene, hydroxylamine.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid contact with incompatible chemicals.

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

11. TOXICOLOGICAL INFORMATION

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

AMMONIUM CHLORIDE:

Standard Draize test (eye, rabbit) = 500 mg/24 hours; Mild

Standard Draize test (eye, rabbit) = 100 mg; Severe

Cytogenetic analysis (fibroblast, hamster) = 400 mg/L

LDLo (oral, infant) = 2 g/kg

LD₅₀ (oral, rat) = 1650 mg/kg

LD₅₀ (intramuscular, rat) = 30 mg/kg

LD₅₀ (oral, mouse) = 1300 mg/kg

LD₅₀ (intraperitoneal, mouse) = 485 mg/kg

LD₅₀ (intravenous, mouse) = 358 mg/kg; Convulsions or effect on seizure threshold, coma, Respiratory stimulation

LDLo (subcutaneous, mouse) = 500

mg/kg LDLo (oral, dog) = 600 mg/kg

LDLo (oral, rabbit) = 1 g/kg

LDLo (subcutaneous, rabbit) = 200 mg/kg

LDLo (intravenous, rabbit) = 78 mg/kg

LDLo (subcutaneous, guinea pig) = 72 mg/kg

LDLo (intravenous, guinea pig) = 220 mg/kg

COPPER SULFATE:

LD₅₀ (Oral-Rat) 300 mg/kg

LD₅₀ (Oral-Mouse) 369 mg/kg: Behavioral: somnolence (general depressed activity), convulsions or effect on seizure threshold

LD₅₀ (Intraperitoneal-Rat) 20 mg/kg: Behavioral: somnolence (general depressed activity), convulsions or effect on seizure threshold

LD₅₀ (Intraperitoneal-Mouse) 7182 µg/kg

LD₅₀ (Subcutaneous-Rat) 43 mg/kg

LD₅₀ (Intravenous-Rat) 48,900 µg/kg: Behavioral: somnolence (general depressed activity), convulsions or effect on seizure threshold

LD₅₀ (Unreported-Rat) 520 mg/kg

LD₅₀ (Intravenous-Mouse) 23,300 µg/kg: Behavioral: somnolence (general depressed activity), convulsions or effect on seizure threshold

LD₅₀ (Intravenous-Rabbit) 10 mg/kg: Behavioral: convulsions or effect on seizure threshold, food intake (animal); Gastrointestinal: hypermotility, diarrhea

LDLo (Intravenous-Guinea Pig) 2 mg/kg

LDLo (Intravenous-Frog) 25 mg/kg

LDLo (Oral-Woman) 47,320 µL/kg: Gastrointestinal: hypermotility, diarrhea; Liver: hepatitis (hepatocellular necrosis), diffuse; Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis)

LDLo (Oral-Man) 857 mg/kg: Gastrointestinal: nausea or vomiting

TDLo (Oral-Human) 11 mg/kg: Gastrointestinal: gastritis, hypermotility, diarrhea, nausea or vomiting

COPPER SULFATE (continued):

LDLo (Oral-Human) 50 mg/kg: Behavioral: somnolence (general depressed activity); Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Blood: hemorrhage

TDLo (Oral-Rat) 915 mg/kg/1 year-intermittent: Cardiac: changes in coronary arteries; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)

TDLo (Oral-Woman) 2100 µg/kg/5 weeks-intermittent: Gastrointestinal: hypermotility, diarrhea, nausea or vomiting, other changes
TDLo (Oral-Child) 150 mg/kg: Kidney, Ureter, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Blood: other hemolysis with or without anemia
TDLo (Oral-Rat) 157 mg/kg/6 weeks-intermittent:

Endocrine: changes in adrenal weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TDLo (Oral-Rat) 7530 mg/kg/30 days-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol), changes in erythrocyte (RBC) count; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: multiple enzyme effects

TDLo (Oral-Rat) 2 gm/kg/20 days-intermittent: Liver: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases, Enzyme inhibition, induction, or change in blood or tissue levels: other Enzymes

TDLo (Oral-Rat) 3 gm/kg/8 weeks-continuous: Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune response, decrease in humoral immune response

TDLo (Oral-Mouse) 2 gm/kg/3 weeks-continuous: Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune response, decrease in humoral immune response

TDLo (Oral-Pig) 140 mg/kg: female 1-15 week(s) after conception lactating female 4 week(s) post-birth: Reproductive: Effects on Newborn: biochemical and metabolic

TDLo (Intraperitoneal-Rat) 791 mg/kg/18 weeks-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Parenteral-Chicken) 10 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Endocrine: tumors

COPPER SULFATE (continued):

TDLo (Intraperitoneal-Rat) 7500 µg/kg: female 3 day(s) after conception: Reproductive: Fertility: other measures of fertility

TDLo (Subcutaneous-Rat) 12,768 µg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct

TDLo (Subcutaneous-Mouse) 12,768 µg/kg: male 30 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct

TDLo (Intratesticular-Rat) 3192 µg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct

TDLo (Intravenous-Mouse) 3200 µg/kg: female 8 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: Central Nervous System, cardiovascular (circulatory) system

TDLo (Intravenous-Mouse) 3200 µg/kg: female 7 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

TDLo (Intravenous-Hamster) 2130 µg/kg: female 8 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Specific Developmental Abnormalities: Central Nervous System, body wall

Mutation in Microorganisms (Bacteria-*Escherichia coli*) 7500 ppt/3 hours

Mutation in Microorganisms (Bacteria-*Bacillus subtilis*) 400 µmol/L

Mutation Test Systems-not otherwise (Bacteria-*Bacillus subtilis*) 400 µmol/L

Sex Chromosome Loss and Nondisjunction (Parenteral-*Drosophila melanogaster*) 1000 ppm

Sex Chromosome Loss and Nondisjunction (Unreported-*Drosophila melanogaster*) 7100 ppm

DNA Damage (Rat-*Ascites tumor*) 500

µmol/L DNA Damage (Rat-Liver) 1 mmol/L

DNA Inhibition (Intraperitoneal-Mouse) 20 gm/kg

Morphological Transformation (Hamster-Embryo) 80 µmol/L

Unscheduled DNA Synthesis (Hamster-Embryo) 200 µmol/L

11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: This product may irritate skin, eyes and other contaminated tissue.

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

COPPER SULFATE (as a copper compound): EPA-D (Not Classifiable as to Human Carcinogenicity)

SENSITIZATION TO THE PRODUCT: The components of this product are not known to be skin or respiratory sensitizers.

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

Mutagenicity: This product is not reported to produce mutagenic effects in humans. There are mutagenic data in microorganisms and animals for the Copper Sulfate component of this product.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans. There are embryotoxic data for the Copper Sulfate component of this product. These data were obtained from animal test studies in which specific animal tissues were exposed to high concentrations of these compounds.

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

Reproductive Toxicity: This product is not reported to cause reproductive effects in humans. There are reproductive toxicity data from animal studies of the Copper Sulfate component of this product.

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 EXPOSURES INDICES (BEIs): Currently, there are no Biological Exposure Indices (BEIs) determined for any component 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:

AMMONIUM CHLORIDE:

Water solubility: 28.3% g/100 mL (0°C), 37.840 lb/100lb (70°F).

Ammonium Chloride can destroy food chain organisms and gamefish in natural waters. Threshold concentrations for fish = 0.5 ppm. Acute Hazard Level Threshold: For Vegetables and other crops 750 ppm (Cl).

Persistence: Ammonium will be attacked by bacteria and converted to nitrate. Major Species Threatened: Micro-aquatic life.

Food Chain Concentration Potential: None.

COPPER SULFATE:

Persistence: May persist at toxic levels indefinitely.

Biodegradation: No evidence was found to indicate that there is any biotransformation process for copper compounds which would have a significant bearing on the fate of copper in aquatic environments (soluble copper salts).

Bioconcentration: As an essential nutrient, copper is accumulated by all plants, and animals (The following) bioconcentration factors are the ratio derived from the concentrations of the element in the aquatic organism (in ppm of wet wt) divided by the concentration of the element in water (in ppm) (Tabular data) Algae: *Scenedesmus quadricarda*, 12; *Anabaena variabilis*, 300; *Scenedesmus sp.*, 2,400; and *Chlorella sp.*, 2,400; Bacteria 630-1,567; plants (marine, and fresh), 1,000; invertebrates (marine), 1,670, and invertebrates (freshwater), 1,000; molluscs, 30,000; insects, 546; Fish (marine), 667, and fish (freshwater), 200 (soluble copper salts).

Terrestrial Fate: In soil, Copper Sulfate is partly washed down to lower levels, partly bound by soil components, and partly oxidatively transformed.

Aquatic Fate: Several processes determine the fate of copper in the aquatic environment: complex formation, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. The formation of complexes with organic ligands modifies the solubility and precipitation behavior of copper such that solid copper species probably do not precipitate under normal circumstances. Furthermore, complexed copper is more easily adsorbed by clay and other surfaces than the free (hydrated) cation. The aquatic fate of copper is highly dependent on such variables as pH, Eh /oxidation-reduction potential in millivolts/, concentrations of organic materials and adsorbents, availability of precipitating iron and manganese oxides, biological activity, and competition with other heavy metals.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful to plant and animal in the natural environment life if large volumes of it are released into the environment.

12. ECOLOGICAL INFORMATION (Continued)

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. Additional aquatic toxicity data are available as follows:

AMMONIUM CHLORIDE:

LC₅₀ (*Daphnia magna*) 24 hours = 202 mg/L
 LC₅₀ (*Daphnia magna*) 48 hours = 161 mg/L
 LC₅₀ (*Daphnia magna*) 72 hours = 67 mg/L
 LC₅₀ (*Daphnia magna*) 96 hours = 50 mg/L
 LC₅₀ (*Daphnia magna*) 100 hours = 139 mg/L
 LC₅₀ (*Lymnaea sp.* Snail egg) 24 hours = 241 mg/L
 LC₅₀ (*Lymnaea sp.* Snail egg) 48 hours = 173 mg/L
 LC₅₀ (*Lymnaea sp.* Snail egg) 72 hours = 73 mg/L
 LC₅₀ (*Lymnaea sp.* Snail egg) 96 hours = 70 mg/L
 LC₅₀ (*Lepomis macrochirus*) 24-96 hours = 725 mg/L
 LC₅₀ (*Carassius carassius*) 24 hours = 640 mg/L

COPPER SULFATE:

LC₅₀ (*Anguilla rostrata* American eel) 96 hours = 3.20 mg/L (conditions of bioassay not specified)

COPPER SULFATE (continued):

LC₅₀ (*Schistosoma mansoni miricidia* larvae) 8.5 mg/L per hr (conditions of bioassay not specified)
 LC₉₀ (*Schistosoma mansoni miricidia*) 15.75 mg/L per hr (conditions of bioassay not specified)
 LC₅₀ (*Puntius conchoni*) 48 hours = 0.709 mg/L in water hardness of 310 mg/L calcium carbonate (static bioassay)
 LC₅₀ (*Puntius conchoni*) 72 hours = 0.646 mg/L in water hardness of 310 mg/L calcium carbonate (static bioassay)
 LC₅₀ (*Puntius conchoni*) 96 hours = 0.571 mg/L in water hardness of 310 mg/L calcium carbonate (static bioassay)
 LC₅₀ (*Crassostrea gigas* oyster) 96 hours = 0.56 mg/L (Flow through system, natural seawater at 13°C)
 EC₅₀ (*Thalassiosira pseudonana* alga, saltwater) 72 hours = 5 mg/L (Growth rate bioassay)
 LC₅₀ (*Corbicula manilensis* Asiatic clam) 96 hours = 2,600 mg/L (conditions of bioassay not specified)

COPPER SULFATE (continued):

EC₅₀ (*Selenastrum capricornatum* green alga) 14 days = 85 mg/L (Cell volume bioassay)
 LC₅₀ (*Oncorhynchus kisutch* coho salmon) 96 hours = 286 mg/L (conditions of bioassay not specified)
 LC₅₀ (*Rangia cuneata* clam) 96 hours = 7.4 mg/L (Synthetic and natural seawater at 24°C; other conditions not specified)
 LC₅₀ (*Haliotis cracherodii* abalone) 96 hours = 0.05 mg/L (Static system, natural seawater at 14°C)
 EC₁₀ (*Salmo gairdneri* rainbow trout; embryo, larvae) 28 days = 16.5 mg/L; death, and deformity (conditions of bioassay not specified)
 EC₅₀ (*Nitzschia closterium* alga, saltwater) 96 hours = 33 mg/L (Growth rate bioassay)
 EC₅₀ (*Chlorella stigmatophora* alga, saltwater) 21 days = 70 mg/L (Cell volume bioassay)

13. DISPOSAL CONSIDERATIONS

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

EPA WASTE NUMBER: Not applicable.

14. TRANSPORTATION INFORMATION

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

PROPER SHIPPING NAME: Not applicable.

HAZARD CLASS NUMBER and DESCRIPTION: Not applicable.

UN IDENTIFICATION NUMBER: Not applicable.

DOT LABEL(S) REQUIRED: Not applicable.

PACKAGING GROUP: Not applicable.

NORTH AMERICAN RESPONSE GUIDEBOOK NUMBER (2000): Not applicable.

MARINE POLLUTANT: The components of this product are not designated as Marine Pollutants, as per 49 CFR, Appendix B to § 172.101.

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is not considered as dangerous goods under rules of IATA.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product not is considered by the United Nations Economic Commission for Europe to be dangerous goods.

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:

COMPONENT	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Ammonium Chloride	No	Yes	No
Copper Sulfate	No	Yes	No

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

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) may apply, per 40 CFR 370.20.

U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No

U.S. CERCLA REPORTABLE QUANTITY (RQ): Ammonium Chloride = 2270 kg (5000 lb); Copper Sulfate = 4.54 kg (10 lb)
U.S. TSCA INVENTORY STATUS: All components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: The components of this product have requirements under other U.S. Federal regulations, as follows:

AMMONIUM CHLORIDE:

EPA: Ammonium Chloride is designated as a hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of Ammonium Chloride.

COPPER SULFATE:

EPA: Copper Sulfate is designated as a toxic pollutant, pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations.

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

Alaska - Designated Toxic and Hazardous

Substances: Ammonium Chloride.

California - Permissible Exposure Limits for

Chemical Contaminants: Ammonium Chloride.

Florida - Substance List: Ammonium Chloride.

Illinois - Toxic Substance List: Ammonium Chloride.

Kansas - Section 302/313 List: None.

Massachusetts - Substance List: Ammonium Chloride.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: Ammonium Chloride.

Missouri - Employer Information/Toxic Substance List: Ammonium Chloride, Copper Sulfate.

New Jersey - Right to Know Hazardous Substance List: Ammonium Chloride, Copper Sulfate.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: Ammonium Chloride, Copper Sulfate.

Pennsylvania - Hazardous Substance List:

Ammonium Chloride, Copper Sulfate.

Rhode Island - Hazardous Substance List:

Ammonium Chloride.

Texas - Hazardous Substance List: None.

West Virginia - Hazardous Substance List: None.

Wisconsin - Toxic and Hazardous Substances: None.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product does not contain any chemicals on the California Proposition 65 lists.

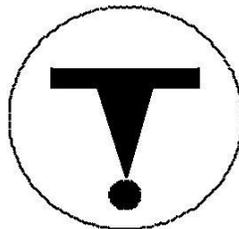
ANSI LABELING (Z129.1): **CAUTION!** MAY BE IRRITATING IF INHALED OR BY SKIN CONTACT. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing vapors or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH-approved respiratory protection, as appropriate. **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. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material or neutralizing agent for acids. Place residue 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: No component of this product is on the Priority Substances lists under the Canadian Environmental Protection Act (CEPA).

CANADIAN WHMIS SYMBOLS: **Class D2B:** Material Causing Other Toxic Effects (Chronic 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.

15. REGULATORY INFORMATION (Continued)

EUROPEAN COMMUNITY INFORMATION FOR PRODUCT:

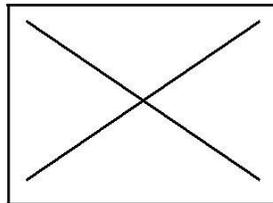
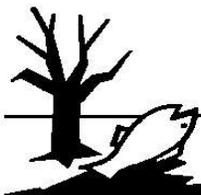
PRODUCT: Based on the information of the products components described above and an assessment of the physical and health hazards associated with this material, the following assignments have been made (per Council Directive 67/548/EEC). It is important to note this substance has not been fully tested.

CODE LETTER AND HAZARD DESIGNATION OF PRODUCT: Xn [Harmful]; N [Dangerous for the Environment]

RISK PHRASES: [R20]: Harmful by Inhalation. [R: 22]: Harmful if swallowed. [r: 36]: irritating to eyes. [R: 51/52]: Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES: [S: (1/2-)]: Keep out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) [S: 16]: Keep container tightly closed. [S: 24/25]: Avoid contact with skin and eyes. [S: 26]: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. [S: 36/37/39]: Wear suitable protective clothing, gloves, and eye/face protection. [S: 45]: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). [S: 46] If swallowed, seek medical advice immediately and show this container or label. [S: 60]: This material and its container must be disposed of as a hazardous waste. [S:61]: Avoid release to the environment. Refer to special instructions/Safety data sheets.

EUROPEAN COMMUNITY ANNEX II HAZARD SYMBOLS:



EUROPEAN COMMUNITY INFORMATION FOR CONSTITUENTS: The following information is available for this product.

AMMONIUM CHLORIDE

EC EINECS/ELINCS NUMBER: 235-186-4

HAZARD CLASSIFICATION: [Xn] Harmful. [Xi]: Irritant.

RISK PHRASES: [R: 22]: Harmful if swallowed. [R: 36]: Irritating to eyes.

SAFETY PHRASES: [S: 2½-]: Keep out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) [S: 22]: Do not breathe dust.

COPPER SULFATE

EC EINECS/ELINCS NUMBER: 231-847-6

HAZARD CLASSIFICATION: [Xn] Harmful. [Xi]: Irritant. [N]: Dangerous for the Environment.

RISK PHRASES: [R: 22]: Harmful if swallowed. [R: 36/38]: Irritating to eyes and skin. [50/53]: Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES: [S: 2½-]: Keep out of reach of children. (*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.*) [S: 22]: Do not breathe dust. [S: 60]: This material and its container must be disposed of as a hazardous waste. [S:61]: Avoid release to the environment. Refer to special instructions/Safety data sheets.

16. OTHER INFORMATION

PREPARED BY:

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9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

DATE OF PRINTING

March 9, 2006

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 compound.

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

TLV - Threshold Limit Value - an airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

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

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

U.S. and CANADA: This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/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.

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.