



# MATERIAL SAFETY DATA SHEET

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

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

### 1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED):** **COPPER COUNT<sup>®</sup> N SOLUTION**

**CHEMICAL NAME/CLASS:** Copper Ammonium Complex

**TECHNICAL BULLETINS:** Not Applicable

**PRODUCT USE:** Pesticide

**SUPPLIER/MANUFACTURER'S NAME:** **MINERAL RESEARCH AND DEVELOPMENT**

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**MSDS PREPARATION DATE:** January 20, 2003

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% v/v	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		IDLH mg/m <sup>3</sup>	OTHER
			TLV mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	PEL mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>		
Copper Ammonium Complex The following exposure limits are for Copper, dusts and mists	23087-46-9	5-10	1 (Inhalable Particulates)	NE	1	NE	100	NIOSH REL: TWA = 1 mg/m <sup>3</sup> DFG MAK: 1 mg/m <sup>3</sup> EPA-D
Water	7732-18-5	Balance	NE	NE	NE	NE	NE	NE

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1993 format.

### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a dark blue liquid with an odor of vinegar. The primary health hazard associated with this product is the potential for mild irritation of eyes, skin, and other contaminated tissue. This product may cause skin sensitization in certain individuals. This product is not flammable or reactive. Emergency responders must wear the personal protective equipment suitable for the situation to which they are responding.

**SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:** The primary routes of overexposure for the solution are via inhalation and contact with skin and eyes. The following paragraphs describe the symptoms of overexposure to this material.

**INHALATION:** If vapors, mists, or sprays of this product are inhaled, they may irritate the nose, throat, and lungs. Generally, symptoms are alleviated after overexposure ends.

Though not likely to occur via anticipated use of this product, severe, chronic inhalation of Copper particulates can cause a disorder known as metal fume fever. Symptoms of metal fume fever include headache, metallic or sweet taste in the mouth, cough, thirst, throat irritation, shortness of breath, fever, sweating, pain in the legs and chest, muscle aches, nausea, vomiting, tiredness, and weakness. Recovery is usually within two days. Such chronic inhalation overexposure may cause nasal ulceration and perforation, liver and kidney disorders, and adverse effects on the lungs.

**CONTACT WITH SKIN or EYES:** Depending on the duration of overexposure, contact with the eyes will cause mild to moderate irritation, and pain. Depending on the duration of skin contact, skin overexposures will cause reddening, discomfort, and severe irritation. Repeated or prolonged exposures can result in skin sensitization reactions (e.g., rashes, welts) in certain individuals.

**SKIN ABSORPTION:** Skin absorption is not a significant route of overexposure for the components of this product.

**INGESTION:** Though not a likely route of occupational exposure for this product, ingestion can result in vomiting, weakness, abdominal cramps, headache, diarrhea, nausea, vomiting, and dizziness.

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

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

**ACUTE:** Depending on the duration of contact, overexposures can cause mild to moderate irritation of the respiratory system, skin, and eyes.

**CHRONIC:** Prolonged or repeated skin contact can lead to dermatitis and skin sensitization reactions (e.g., rashes, welts). Liver and kidney disorders, and adverse effects on the lungs, may also occur as a result of chronic exposures. See Section 11 (Toxicology Information) for additional data.




**TARGET ORGANS:** Acute: Skin, eyes. Chronic: Lungs, kidneys, liver.

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

### 4. FIRST-AID MEASURES

**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.

**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. Victim must seek immediate medical attention.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	2
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			C
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		
For routine industrial applications			

**See Section 16 for Definition of Ratings**

## 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. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

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.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not flammable.

**AUTOIGNITION TEMPERATURE:** Not flammable.

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

**FIRE EXTINGUISHING MATERIALS:**

**Water Spray:** YES

**Foam:** YES

**Halon:** YES

**Carbon Dioxide:** YES

**Dry Chemical:** YES

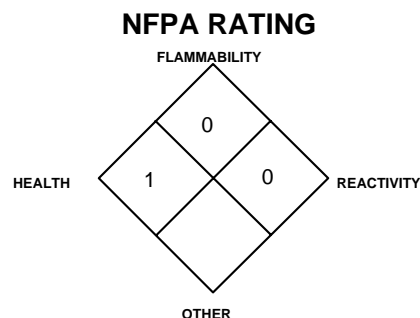
**Other:** Any "ABC" Class.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** When involved in a fire, this material may decompose and produce copper compounds, ammonia, and nitrogen oxides.

**Explosion Sensitivity to Mechanical Impact:** Not sensitive.

**Explosion Sensitivity to Static Discharge:** Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if they have not been exposed to heat and if it can be done without risk to personnel. If this product is involved in a fire, fire run-off water should be contained to prevent possible environmental damage. Rinse contaminated equipment thoroughly before returning to service.



**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 large spill, clear the affected area, and protect people.

In the event of a non-incident release (e.g., 55-gallon release in which excessive splashes or sprays can be generated), minimum Personal Protective Equipment should be Level C: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and an air-purifying respirator with a high-efficiency particulate filter. Level B, which includes Self Contained Breathing Apparatus, must be worn in situations in which excessive sprays or mists can be generated, or the oxygen level is less than 19.5% or unknown. Absorb spilled liquid with lime, polypads or other suitable absorbent materials. Decontaminate the area thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with U.S. Federal, State, and local waste disposal regulations, or applicable Canadian Standards (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 hands after handling this product. Do not eat, drink, smoke or apply cosmetics while handling this product. All work practices should minimize the generation of splashes and aerosols. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual liquid or vapors therefore, empty containers should be handled with care.

## 7. HANDLING and STORAGE (Continued)

This pesticide is toxic to fish and aquatic organisms. Do not apply directly to water. Drift and runoff water from treated areas may be hazardous to fish and aquatic organisms in adjacent sites. Do not allow rinsate from cleaning of equipment or disposed material to enter surface or ground water. Do not apply this product directly to water, or to areas where surface water is present or to terrestrial areas below the mean high water mark.

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Do not apply this product directly, or through drift expose workers or other persons. The area being treated must be vacated by unprotected persons. Do not enter area without protective clothing until spray has dried. Because certain states require more restrictive re-entry intervals after application, consult your state department of agriculture for further information,

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. Keep container tightly closed when not in use. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. 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.

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. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or applicable Canadian standards.

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## 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. Use a corrosion-resistant ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Use local exhaust ventilation, and process enclosure if necessary, to control mist formation. Supply sufficient replacement air to make up for air removed by system. Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed (i.e. air-purifying respirator with an acid-gas cartridge), use only protection authorized in 29 CFR 1910.134 or applicable U.S. State regulations (or the appropriate standards of Canada and its Provinces). Use supplied air respiration protection during response procedures to non-incident releases and if oxygen levels are below 19.5% or are unknown. The following are NIOSH recommendations for Copper (Dusts and Mists) are provided for further information:

### CONCENTRATION

UP TO 5 mg/m<sup>3</sup>:

UP TO 10 mg/m<sup>3</sup>:

UP TO 25 mg/m<sup>3</sup>:

UP TO 50 mg/m<sup>3</sup>:

UP TO 100 mg/m<sup>3</sup>:

### RESPIRATORY EQUIPMENT FOR COPPER DUSTS AND MISTS

Dust and mist respirator.

Dust and mist respirator except single-use and quarter-mask respirator (if not present as a fume); or SAR.

Powered air-purifying respirator with dust and mist filter(s); or SAR operated in a continuous-flow mode.

Full-facepiece respirator with high-efficiency particulate filter(s); or full-facepiece SCBA; or full-facepiece SAR; or powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter.

Positive pressure, full-facepiece SAR.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Full-facepiece respirator with high-efficiency particulate filter(s); or escape-type SCBA.

NOTE: The IDLH for copper dusts and mists is 100 mg/m<sup>3</sup>, as Cu.

EYE PROTECTION: Splash goggles or safety glasses.

HAND PROTECTION: Wear Neoprene or Rubber gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS.

BODY PROTECTION: Use body protection appropriate for task. An apron, or other impermeable body protection is suggested. Full-body chemical protective clothing is recommended for emergency response procedures.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY: Not established

EVAPORATION RATE (n-BuAc = 1): Similar to water.

SPECIFIC GRAVITY @15°C (59°F): 1.16

FREEZING POINT or RANGE: < 0°C (< 32°F)

SOLUBILITY IN WATER: Completely

BOILING POINT: > 100°C (> 212°F)

VAPOR PRESSURE: Not established.

pH @15°C (59°F): Not established.

ODOR THRESHOLD: Not applicable.

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not available.

APPEARANCE AND COLOR: This product is a dark blue, aqueous liquid with an odor of vinegar.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance and odor are distinguishing characteristics of this product.

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## 10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Copper compounds, ammonia, and nitrogen oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Many copper compounds form highly unstable acetylides. This solution will not be compatible with strong oxidizers and water-reactive materials.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Extreme heat and contact with incompatible chemicals.

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## PART IV

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

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## 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicology data for the components of this product specifically listed in Section 2 (Composition and Information on Ingredients) are not currently available.

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer causing agents by these agencies. Copper compounds are listed as follows: EPA-D (Not Classifiable as a Human Carcinogen).

IRRITANCY OF PRODUCT: This product is severely irritating and corrosive to contaminated tissue, especially after prolonged contact.

SENSITIZATION OF PRODUCT: This product may cause skin sensitization reactions (e.g., rashes, welts, upon prolonged or repeated exposure..

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.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

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

Reproductive Toxicity: This product is not reported to cause reproductive toxicity effects in humans.

*A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which 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 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.*

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing dermatitis, other skin disorders, and disorders affecting the Target Organs (see Section 3, Hazard Identification), respiratory diseases may be aggravated by overexposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH Biological Exposure Indices (BEIs) associated with the components of this product.

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## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

**ENVIRONMENTAL STABILITY:** The components of this product are relatively stable under ambient, environmental conditions. Additional environmental data for compounds which can be released from this product are available as follows:

**COPPER:** Solubility: Insoluble. There is no evidence of any biotransformation for copper compounds. Copper is accumulated by all plants and animals. BCF Algae = 12; plants = 1,000; invertebrate = 1,000, fish = 667 and fish = 200 (Soluble copper salts).

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** Copper Ammonium Complex (a component of this product) is a fungicide; subsequently, plants contaminated with this product may be adversely affected or destroyed. Animals contaminated with this solution may be injured. Refer to Section 11 (Toxicology Information) for clinical data on the effects of this product's components on test animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** Due to the fungicidal nature of this product, a release in a river or other body of water (especially in large volumes) will kill fish and other aquatic life. Additional aquatic toxicity data are available as follows:

**COPPER:**

LC<sub>50</sub>(fathead minnows) = 0.14 ppm in hard water

LC<sub>50</sub>(bluegill) = 0.02 ppm in soft water

LC<sub>50</sub>(brook trout) = 0.09 ppm in soft water

## 13. DISPOSAL CONSIDERATIONS

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

**EPA WASTE NUMBER:** Not applicable to wastes consisting only of this product.

**PESTICIDE DISPOSAL:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to the label instruction, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

**PLASTIC CONTAINER DISPOSAL:** Triple rinse (or equivalent), then offer the container for recycling or reconditioning. Alternatively, puncture the container and dispose of in a procedure approved by State and local authorities.

## 14. TRANSPORTATION INFORMATION

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

**PROPER SHIPPING NAME:** Not applicable.  
**HAZARD CLASS NUMBER and DESCRIPTION:** Not applicable.  
**UN IDENTIFICATION NUMBER:** Not applicable.  
**PACKING GROUP:** Not applicable.  
**DOT LABEL(S) REQUIRED:** Not applicable.  
**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 1996:** Not applicable.

**MARINE POLLUTANT:** No component of the product is designated by the DOT to be a Marine Pollutant (per 49 CFR 172.101, Appendix B).

**TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** THIS PRODUCT IS NOT CONSIDERED AS DANGEROUS GOODS.

## 15. REGULATORY INFORMATION

**ADDITIONAL UNITED STATES REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** This product is 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)
COPPER AMMONIUM COMPLEX	NO	YES(as a Copper Compound)	YES (as a Copper Compound)

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Not applicable.

## 15. REGULATORY INFORMATION (Continued)

U.S. CERCLA REPORTABLE QUANTITY (RQ): Copper Ammonium Complex = Not established for Copper Compounds as a generic class, although the class is a CERCLA Hazardous Substance.

U.S. TSCA INVENTORY STATUS: This product is not subject to the requirements of the TSCA because it is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act.

OTHER U.S. FEDERAL REGULATIONS: The labeling and use requirements of the Federal Insecticide, Fungicide, and Rodenticide Act are applicable to this product.

U.S. STATE REGULATORY INFORMATION: The components of this product are covered under the following specific State regulations:

**Alaska - Designated Toxic and Hazardous Substances:** Copper (fume, dust and mist).

**California - Permissible Exposure Limits for Chemical Contaminants:** Copper.

**Florida - Substance List:** None.

**Illinois - Toxic Substance List:** Copper Compounds.

**Kansas - Section 302/313 List:** None.

**Massachusetts - Substance List:** Copper.

**Michigan - Critical Materials Register:** None.

**Minnesota - List of Hazardous Substances:** None.

**Missouri - Employer Information/Toxic Substance List:** Copper.

**New Jersey - Right to Know Hazardous Substance List:** Copper.

**North Dakota - List of Hazardous Chemicals, Reportable Quantities:** Copper.

**Pennsylvania - Hazardous Substance List:** Copper.

**Rhode Island - Hazardous Substance List:** Cooper (fume, dust, mist).

**Texas - Hazardous Substance List:** Cooper (fume).

**West Virginia - Hazardous Substance List:** Cooper (fume).

**Wisconsin - Toxic and Hazardous Substances:** Cooper (fume).

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

**LABELING (per ANSI 400.1):** **WARNING!** CAUSES SKIN AND EYE IRRITATION. HARMFUL ABSORBED THROUGH SKIN, OR INHALED. MAY CAUSE SKIN SENSITIZATION REACTIONS IN CERTAIN INDIVIDUALS. Avoid contact with skin, eyes, or clothing. Avoid breathing aerosols, mists, and sprays. Wash thoroughly after handling. Work in well-ventilated area. Do not taste or swallow. Protective clothing, including goggles, should be worn. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

### STATEMENT OF PRACTICAL TREATMENT.

**FIRST-AID:** IF IN EYES: flush with plenty of water. Call a physician. IF ON SKIN, wash with plenty of soap and water. Get medical attention. IF SWALLOWED, call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by tugging the back of the throat with finger, or if available, by administering syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

**IN CASE OF SPILL:** Absorb spill with inert material (sand, polypads, or other absorbent). For large spills, dike area. Consult Material Safety Data Sheet for additional information.

### ENVIRONMENTAL LABEL INFORMATION (Based on 40 CFR Part 156):

**KEEP OUT OF REACH OF CHILDREN**

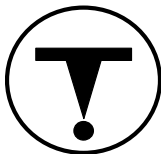
**CAUTION**

**HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

### ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: This product is not subject to the requirements of CEPA because it is regulated under the Pest Control Products Act.

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



## 16. OTHER INFORMATION

**PREPARED BY:**

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January 20, 2003

**DATE OF PRINTING:**

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## DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

### EXPOSURE LIMITS IN AIR:

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which 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 which 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 causes 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: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - 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/m<sup>3</sup>** 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; **TD<sub>01</sub>**, **LDLo**, and **LD<sub>01</sub>**, or **TC**, **TC<sub>01</sub>**, **LCLo**, and **LC<sub>01</sub>**, 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:

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.