U.S. Department
of Transportation
**Research and
Special Programs
Administration**

FEB 5 2004

400 Seventh St., S.W.
Washington, D.C. 20590

Mr. Daren L. Laine
President
Leak Location Services, Inc.
16124 University Oak
San Antonia, TX 78249

Ref. No.: 03-0277

Dear Mr. Laine:

This responds to your letter dated October 30, 2003, regarding the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180), as they apply to Copper sulfate pentahydrate shipped on passenger-carrying airlines. Subsequently, you sent a letter dated November 5, 2003, to clarify your previous request for interpretation.

You stated that your company transports small quantities (less than 5 lbs.) of Copper sulfate pentahydrate crystals (cupric sulfate, copper sulfate, etc.) in checked baggage on passenger-carrying aircraft. The Copper sulfate pentahydrate is packaged in a 16-ounce wide-mouth plastic bottle with a screw top and labeled "Copper Sulfate ($CuSO_4 \cdot 5H_2O$) RQ=10 lbs". The labeled plastic bottle is placed inside a larger PVC container with sealed ends. The double container is then placed inside a suitcase or fiberglass equipment case with other equipment. Your questions are paraphrased and answered as follows:

Q1. Is this material ($CuSO_4 \cdot 5H_2O$) regulated in either form as a hazardous material for purposes of transportation under the HMR?

A1. Cupric sulfate is listed in the §172.101, List of Hazardous Substances, Table 1, Appendix A, with a reportable quantity (RQ) of 10 lbs. Therefore, the material would be regulated as a hazardous substance, as defined in § 171.8, if the quantity of Cupric sulfate, in one package, equals or exceeds the RQ, and must be packaged and shipped as cargo as specified in the HMR.

Since your company is shipping less than 5 lbs. per package, the Cupric sulfate does not meet the definition of a hazardous substance, and provided your product does not meet the definition of any other hazard class, it would not be subject to the HMR and not regulated for purposes of transportation.

Q2. The description in section 14 of the enclosed MSDS is "RQ, Environmentally hazardous substances, solid, n.o.s., (Cupric sulfate)." Does the information shown mean we cannot ship this material, and how do we complete Section 14 to continue to ship our product?

A2. If the material is a hazardous substance, it would be described as "RQ, Environmentally hazardous substances, solid, n.o.s., (Cupric sulfate), 9, UN3077, III"and must be shipped in non-bulk packaging in accordance with § 173.213. A MSDS may be used to satisfy the emergency response information requirements specified in §172.602 of the HMR. However, the information on a MSDS is required by the Department of Labor's Occupational Safety and Health Administration (OSHA), not the U. S. Department of Transportation.

Q3. Do we have to declare this material prior to flight, and can it be shipped without special handling.

A3. If the material is not a hazardous substance, and thus not a hazardous material, it would not be subject to the HMR, and would not require special handling.

Although, it appears that your product may not be regulated, the issue of whether an airline may deny your shipment is not under our purview. Each airline determines what is allowed on its aircraft. Also, air carrier hazmat screening is conducted to comply with the Transportation Security Agency's (TSA) security rules. You may wish to contact the TSA to make sure your material is not considered a security risk.

I hope this information is helpful, If we can be of further assistance, please contact us.

Sincerely,

Susa Gorsky

Susan Gorsky
Senior Transportation Regulations Specialist
Office of Hazardous Materials Standards

LEAK LOCATION SERVICES, INC.

16124 UNIVERSITY OAK • SAN ANTONIO, TEXAS 78249 • (210) 408-1241 / FAX (210) 408-1242

October 30, 2003

Engrum
3172.101 App. A
Hazardous Substance
.. 03-0277

Mr. Edward Mazzullo
Director of The Office of Hazardous Materials Safety
Washington, D.C

Fax: (202) 366-3012

Subject: Transportation of Copper Sulfate Pentahydrate as Checked Airline Baggage

Dear Mr. Mazzullo:

I talked today with Mr. Michael Stephens of your office regarding the DOT regulations for shipping copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) on passenger airlines. As was discussed with Mr. Stephens our company transports on a regular basis as checked airline baggage the following:

- Copper sulfate crystals (Cupric sulfate);
- Quantity shipped is less than 5 lbs;
- Packaged in a plastic container and labeled;
- We also use an overpack type container for the plastic container;
- An MSDS data sheet accompanies the baggage;
- This double package is placed in an equipment suitcase.

The airlines have recently stated that this material is a hazardous substance and must be transported as such. We have also been questioned by TSA personnel. However, as we understand the regulations, this material is not regulated or considered a hazardous material as long as we are transporting less than 10 lbs. Therefore, we are transporting this material in an appropriate manner.

We request that The Office of Hazardous Materials Safety provide us with the proper guidance for transporting copper sulfate pentahydrate, cupric sulfate, copper sulfate, etc. This material is available in crystal and powder form from various suppliers. Specifically we request a letter answering the following questions:

- Is this material ($CuSO_4 \cdot 5H_2O$) in either form regulated per DOT?;
- Is this material a hazardous material for shipping purposes?;
- Does the airline have cause for denying our shipment per the regulations?
- How do we respond to Section 14 of the attached ZEP MSDS?
- Does Section 14 mean we can not ship the material as we have in the past?
- Do we have to declare this material prior to our flight?; and
- Can this material be shipped as described without special handling?;

We thank you in advance for your prompt response to our questions. If you have questions about the this request, please contact the undersigned at (210) 408-1241.

Very truly yours,

Daren L. Laine
President

enclosure: MSDS - ZEP Root Kill II
MSDS - Tennessee Brand Copper Sulfate

cc: John Andrews - SWA Safety Manager - (214) 792-6201

ENFORCER Products, Inc.
P.O. Box 1060
Cartersville, GA 30120
1-888-805-HELP

Material Safety Data Sheet
AND SAFE HANDLING DISPOSAL INFORMATION

Section 1. Chemical Product and Company Identification

Product name	**Root Kill II**
Product Code	**ZDCR-2C**
Formula No.	**Not available.**
Date of Issue	**05/02/02** **Version 1.0**
Emergency telephone number	For MSDS Information: Compliance Services, 404 352 1680 For a Medical Emergency: Toll Free INFOTRAC, 877 541 2016 (Calls Recorded) For a Transportation Emergency: Toll Free CHEMTREC, 800 424 9300 (Calls Recorded)
Prepared by	Acuity Specialty Products Group 1420 Seaboard Industrial Blvd. Atlanta, GA 30318

Section 2. Composition, Information on Ingredients

Name of Hazardous Ingredients	CAS #	% by Weight	Exposure Limits
1) Copper sulfate pentahydrate	7758-99-8	90-100	OSHA PEL Z2 (United States). TWA: 1 mg/m³ Form: Dusts and Mists

Section 3. Hazards Identification

Acute Effects **Routes of Entry** Absorbed through skin. Eye contact. Inhalation. Ingestion.

Eyes Severely irritating to the eyes. Eye exposure may cause reversible eye injury.

Skin Hazardous in case of skin contact (irritant, sensitizer). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Prolonged exposure may result in skin burns.

Inhalation Hazardous in case of inhalation. Inhalation of dust will produce irritation to the respiratory tract, characterized by burning, sneezing and coughing.

Ingestion Toxic if swallowed. Ingestion may cause severe gastric disturbances, burning in throat, and circulatory failure.

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Personal Protection	E

Chronic Effects The substance is toxic to kidneys and the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage.

Carcinogenic Effects Not available.

See Toxicological Information (section 11)

Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Section 5. Fire Fighting Measures

Flash Point Not applicable. **Flammable Limits** Not applicable.

Flammability Not applicable. **Fire Hazard** Not applicable.

Fire-Fighting Procedures Not applicable.

Continued on Next Page

Section 6. Accidental Release Measures

Spill Clean up: Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Section 7. Handling and Storage

Handling: Avoid contact with eyes, skin and clothing. Do not ingest. Wash thoroughly after handling.
Storage: Keep container dry and tightly closed. Keep container in a cool, well-ventilated area. Store between 40°F and 120°F.

Section 8. Exposure Controls, Personal Protection

Personal Protection

Eyes: Splash goggles.
Body: Wear coveralls or long sleeved shirt and long trousers.
Respiratory: Wear appropriate respirator when ventilation is inadequate.

Protective Clothing (Pictograms)

Section 9. Physical and Chemical Properties

Physical State	Solid. (Crystals.)	Color	Blue.
pH	Neutral.	Odor	Odorless.
Boiling Point	Not available.	Vapor Pressure	Not applicable.
Specific Gravity	The only known value is 2.28 (Water = 1) (Copper sulfate pentahydrate).	Vapor Density	Not available.
VOC (Consumer)	0 (g/l).	Evaporation Rate	Not available.
Solubility	Easily soluble in cold water, hot water.		

Section 10. Stability and Reactivity

Stability and Reactivity: The product is stable.
Incompatibility: Reactive with alkalis and phosphates.
Hazardous Decomposition Products: Not applicable.
Hazardous Polymerization: Not available.

Section 11. Toxicological Information

Toxicity to Animals: Cupric sulfate pentrahydrate:
ORAL (LD50): Acute: 300 mg/kg [Rat.].
Chronic Effects on Humans: Not available.

Section 12. Ecological Information

Ecotoxicity: Not available.
Biodegradable/OECD: Not available.

Section 13. Disposal Considerations

Waste Information: Waste must be disposed of in accordance with federal, state and local environmental control regulations.
Waste Stream: Not available.
Consult your local or regional authorities.

Section 14. Transport Information

Proper shipping name: RQ, Environmentally hazardous substances, solid, n.o.s., (Cupric sulfate)
DOT Classification: Class 9; Miscellaneous hazardous material.
UN number: UN 3077

RQ = 10 lbs per Kelley Dixon EEP 1-800-313-8439 ex 6421

TDG Classification: TDG Class 9.2: Environmentally hazardous material.

Section 15. Regulatory Information

U.S. Federal Regulations: SARA 313 toxic chemical notification and release reporting: Copper compounds
Clean Water Act (CWA) 311: Copper sulfate pentahydrate
Clean air act (CAA) 112 regulated toxic substances: No products were found.

State Regulations: California prop. 65: No products were found.

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2B: Material causing other toxic effects (TOXIC).

Continued on Next Page

ASTRO PRODUCT CODE # 25004

Griffin

MATERIAL SAFETY DATA SHEET

Tennessee Brand Copper Sulfate ($CuSO_4 \cdot 5H_2O$) DATE PREPARED: June 27, 1998

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name(s):	Tennessee Brand Copper Sulfate Crystals Tennessee Brand Copper Sulfate Instant Tennessee Brand Copper Sulfate Feed Grade Tennessee Brand Copper Sulfate Industrial Grade
Synonyms:	Copper Sulfate Large Crystals, Copper Sulfate Medium Crystals, Copper Sulfate Granular Crystals, Copper Sulfate Snow Crystals, Copper Sulfate Superfine Crystals, Copper Sulfate Powdered Instant Bluestone, Copper Sulfate Feed Grade, Bluestone, Blue Vitriol

HAZARD CLASSIFICATION (0-minimal, 1-slight, 2-moderate, 3-serious, 4-severe)

NFPA:	HEALTH-2 FIRE-0 REACTIVITY-0

MANUFACTURER

Company Name:	Griffin Corporation
Address:	PO Box 1847, Rocky Ford Road Valdosta, GA 31603-1847
Emergency Phone #:	(800) 237 1854
CHEMTREC:	(800) 424 9300

2. COMPOSITION/ INFORMATION ON INGREDIENTS

Component Name	% by Wt.	CAS#	ACGIH TWA	OSHA PEL
Copper Sulfate Pentahydrate	99.0	7758-98-7	1 mg/m^3*	1 mg/m^3*

* As copper dusts or mists.
Components not precisely identified are proprietary or not hazardous.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Product is toxic orally but not dermally. It is a skin sensitizer and skin irritant. It is corrosive to the eyes.

POTENTIAL HEALTH EFFECTS

Inhalation:	Copper sulfate is a skin irritant and sensitizer including nasal membranes.
Eye Irritation:	Corrosive to eyes.
Skin Irritation:	Skin irritant and sensitizer especially to some individuals.
Skin Absorption:	Not toxic dermally.
Ingestion:	Moderately toxic in human orally. High intraperitoneal toxicity. Copper sulfate may induce severe gastroenteric distress (vomiting, gastroenteric pain, and local corrosion and hemorrhages). Prostration, anuria, hematuria, anemia, increase in white blood cells, coma, respiratory difficulties and circulatory failure.

ASTRO PRODUCT CODE # 25004

Griffin

MATERIAL SAFETY DATA SHEET

Tennessee Brand Copper Sulfate ($CuSO_4 \cdot 5H_2O$) DATE PREPARED: June 27, 1995

Chronic:	Copper sulfate is reported to have systemic effects in humans which affects the metabolic and excretory functions of the liver and kidney.

4. FIRST AID MEASURES

Inhalation:	Remove victim to fresh air. If not breathing, give artificial respiration preferably mouth-to-mouth. Get medical attention immediately.
Eye Contact:	Hold eyelids open and flush with water, until no evidence of chemical remains (at least 15 - 20 minutes). Get medical attention immediately.
Skin Contact:	Remove contaminated clothing and shoes. Wash with plenty of soap and water until no evidence of chemical remains (approximately 15 - 20 minutes). Get medical attention.
Ingestion:	Drink 1 to 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person. Get medical attention.
Note to Physician:	Probable mucosal damage may contraindicate the use of gastric lavage. Measure against circulatory shock, respiratory depression and convulsion may be needed.

5. FIRE FIGHTING MEASURES

Flash Point & Method:	Not applicable.
Flammable Limits:	Not applicable.
Autoignition Temperature:	Not applicable.

FIRE FIGHTING HAZARDS & PROCEDURES

General Hazard:	Negligible fire hazard when exposed to heat or flame.
Extinguishing Media:	Copper sulfate does not burn, nor will it support combustion. If stored with other combustible products, use water, CO_2 or dry chemical.
Fire Fighting Instructions:	Avoid contact with molten product to prevent serious burns.
Fire Fighting Equipment:	Wear protective clothing and self-contained breathing apparatus.
Hazardous Combustion Products:	If dry heated above 600°C, SO_2 is evolved. If water is used, it will solubilize the $CuSO_4 \cdot 5H_2O$, and care should be taken to keep such water out of streams or other bodies of water.

6. ACCIDENTAL RELEASE MEASURES

Wear protective clothing. Sweep up and place in an appropriate chemical waste container for disposal.

ASTRO PRODUCT CODE # 25004

Griffin

MATERIAL SAFETY DATA SHEET

Tennessee Brand Copper Sulfate ($CuSO_4 \cdot 5H_2O$) DATE PREPARED: June 27, 1995

7. HANDLING AND STORAGE

Storage Temperature:	Not available.
General Information:	Store in a clean, dry area. Keep this material out of the reach of children.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

PESTICIDE APPLICATORS & WORKERS

These workers must refer to the Product Label and Directions For Use attached to the product for Agricultural Use Requirements in accordance with the EPA Worker Protection Standard 40 CFR part 170.

MANUFACTURING, COMMERCIAL BLENDING, & PACKAGING WORKERS

Ventilation:	Control enclosed spaces with adequate ventilation to prevent exceedance of ACGIH TLV or OSHA PEL (1 mg/m^3).
Respiratory Protection:	In enclosed spaces where the TLV or PEL may be exceeded, wear NIOSH/MSHA approved dust or mist respirator.
Eye Protection:	Wear protective eyewear to prevent contact with this substance.
Protective Clothing:	Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves and shoes plus socks.

9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure:	7.3 mg Hg @ 25°C.
Vapor Density (Air = 1):	Not determined.
Specific Gravity:	2.284.
Evaporation Rate (n-Butyl Acetate = 1):	Not determined.
Solubility in Water (% by wt.):	22.37 @ 0°C, 117.95 @ 100°C.
pH (5% soln.):	4.0.
Boiling Point (760 mm Hg):	-5 H_2O @ 150°C.
Melting Point:	-4 H_2O @ 110°C.
Odor:	No odor.
Color:	Blue.
Physical State:	Crystals or powder.

10. STABILITY AND REACTIVITY

General:	This material is stable under normal conditions.
Incompatible Materials:	None known. Product is highly soluble in water, but does not react with the water.
Conditions to Avoid:	Excessive heat.
Hazardous Decomposition:	None at normal process temperatures and pressures. If dry heated above 1100°F (600°C) SO_2 may be released.
Hazardous Polymerization:	Will not occur.

ASTRO PRODUCT CODE # 25004

Griffin

MATERIAL SAFETY DATA SHEET

Tennessee Brand Copper Sulfate ($CuSO_4 \cdot 5H_2O$) *DATE PREPARED: June 27, 1995*

11. TOXICOLOGICAL INFORMATION

ACUTE

Inhalation:	Acute inhalation LC_{50} > 1.48 mg/L air. May cause irritation of the mucous membranes.
Eye Irritation:	Corrosive.
Skin Irritation:	Skin irritant and sensitizer.
Skin Absorption:	Acute dermal LD_{50} >2,000 mg/kg.
Ingestion:	Oral LD_{50} = 300 mg/kg, indicating moderate toxicity.
CHRONIC:	Copper sulfate is reported to have systemic effects in humans which affects the metabolic and excretory functions of the liver and kidney.
Special Health Effects:	Copper-intolerant individuals should not be exposed to this material. No additional information is available on whether overexposure to this material would aggravate other existing special medical conditions.

12. ECOLOGICAL INFORMATION

ECOTOXICITY (copper sulfate pentahydrate)

Test Type	Species	Value
Aquatic LC_{50}	Bluegill	1.5 mg/L
Aquatic LC_{50}	Rainbow Trout	0.17 mg/L
Aquatic EC_{50}	*Daphnia magna*	0.182 mg/L

13. DISPOSAL CONSIDERATIONS

Comply with appropriate disposal regulations. Landfill solids at permitted sites. Use registered transporters.

14. TRANSPORT INFORMATION

DOT (Department of Transportation)

PROPER SHIPPING NAME:	RQ, *Environmentally Hazardous Substances, Solid*, N.O.S. (Cupric Sulfate Pentahydrate) 9, UN3077, III
HAZARD CLASS:	9
IDENTIFICATION NUMBER:	UN3077, III
RQ:	10 lbs.

15. REGULATORY INFORMATION

TSCA:	All product components are on the TSCA Chemical Inventory.
CERCLA:	RQ = 10 lbs. (The Reportable Quantity for Cupric Sulfate, CAS #7758-98-7, according to 40CFR 302.4)
FDA:	This product is Generally Recognized as Safe (GRAS) as a trace mineral for livestock when used in accordance with good management practices. This product is Generally Recognized as Safe (GRAS) as when used in food wrap paper and paperboard products.

ASTRO PRODUCT CODE # 25004

Griffin

MATERIAL SAFETY DATA SHEET

Tennessee Brand Copper Sulfate ($CuSO_4 \cdot 5H_2O$) DATE PREPARED: June 27, 1995

SARA TITLE III

313 Reportable Ingredients:	Copper 25.2%.
Tier I and Tier II:	10,000 lbs.
Form R:	Reportable.

16. OTHER INFORMATION

REVISION SUMMARY

This MSDS replaces the one dated 11/93. This document has been revised into the standard Griffin Corporation ANSI Z400.1 compliant format.

THE INFORMATION IN THIS MSDS RELATES TO THIS SPECIFIC MATERIAL. IT MAY NOT BE VALID FOR THIS MATERIAL IF USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. IT IS THE USERS' RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF THIS INFORMATION FOR THEIR OWN PARTICULAR USE.

LEAK LOCATION SERVICES, INC.

16124 UNIVERSITY OAK • SAN ANTONIO, TEXAS 78249 • (210) 408-1241 / FAX (210) 408-1242

November 5, 2003

Engrum
§ 172.101 App. A.
Hazardous Substance
03-0277

Mr. Edward Mazzullo
Director of The Office of Hazardous Materials Safety
Washington, D.C

Fax: (202) 366-3012

Subject: Transportation of Copper Sulfate Pentahydrate as Checked Airline Baggage

Dear Mr. Mazzullo:

I wish to clarify our letter of October 30, 2003. As stated, Leak Location Services, Inc. has a requirement to transport small quantities (less than 5lbs) of copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) in checked airline passenger baggage. Copper sulfate is a salt that is used for various applications including a dietary supplement for livestock, plant root remover for sewer lines, and as we use as an electrolyte when making electrical measurements. The copper sulfate pentahydrate is packed in a 16-ounce wide-mouth plastic bottle with a screw top and labeled:

Copper Sulfate
($CuSO_4 \cdot 5H_2O$)
RQ = 10 lbs.

Causes irritation to eyes, skin and respiratory tract.
Harmful or fatal if swallowed.

The labeled plastic bottle is placed inside a larger PVC container with sealed ends. The double-container is then placed inside a suite case or fiberglass equipment case with other equipment. The material is then shipped as passenger baggage when LLSI field personnel travel to a project site.

The airline's concern is that this is a hazardous substance. In addition, the airline has stated that this is a "corrosive" material and if spilled would damage the aircraft. As we understand the regulations this material is not regulated or considered a hazardous material as long as we are transporting less than the reportable quantity of 10 lbs. Also, the "corrosive" warning for this material is listed as a health warning and refers to a "corrosive" that is harmful to the eyes, skin, and respiratory tract and not a "corrosive" for metal parts .

We fully understand and appreciate the airlines concern for passenger safety and the safety of their aircraft. We are also aware that the airlines must follow and comply with FAA regulations for the transporting of hazardous materials. However, we do not believe the copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) in the quantities we transport should be considered a hazardous material per DOT guidelines. Furthermore, we feel we are following OSHA and DOT regulations when we transport, store, and handle this material and are transporting this material in a safe and responsible manner.

Therefore, we request that The Office of Hazardous Materials Safety provide us with the proper DOT guidance for transporting copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) as checked baggage on passenger aircraft. We thank you in advance for your prompt response to our questions. If you have questions about the this request, please contact the undersigned at (210) 408-1241.

Very truly yours,

Daren L. Laine
President

cc: John Andrews - SWA Safety Manager - (214) 792-4086
attachment: C.J. Martin Company - MSDS for Copper Sulfate Pentahydrate

MATERIAL SAFETY DATA SHEET

Revised: 02/16/99

SECTION I - IDENTIFICATION OF PRODUCT

MANUFACTURER'S NAME:	C.J. MARTIN COMPANY 2739 PASADENA BLVD. PASADENA, TX 77502
PRODUCT NAME:	MARTIN'S COPPER SULFATE CRYSTALS
EMERGENCY TELEPHONE:	(800) 424-9300 - CHEMTREC
CHEMICAL NAME:	Copper Sulfate Pentahydrate
C.A.S. NAME:	See Section VII
C.A.S. NUMBER:	See Section VII
CHEMICAL FORMULA:	N/A
MOLECULAR WEIGHT:	N/A
CHEMICAL FAMILY:	N/A
D.O.T. HAZARD CLASS:	9 (misc. hazardous materials)
D.O.T. SHIPPING NAME:	ORM-D, Consumer Commodity

SECTION II - PHYSICAL DATA

ODOR:	odorless	MELTING POINT:	110 degrees Celsius
APPEARANCE:	transparent blue crystals	PARTICLE SIZE:	N/A
LBS/GAL:	N/A	CLOUD PT:	N/A
COLOR (G-H):	N/A	PERCENT VOLATILE:	N/A
BOILING POINT:	150 deg. Celsius	EVAPORATION RATE:	N/A
VAPOR PRESSURE:	N/A	FLASH POINT:	N/A
VAPOR DENSITY:	N/A	SPECIFIC GRAVITY:	N/A
BULK DENSITY (FLUFFED):	N/A	BULK DENSITY (SETTLED):	N/A
REFRACTIVE INDEX:	N/A	SOLUBILITY (OIL):	N/A
		SOLUBILITY (WATER):	24.3 grams/100 grams at 30 degrees Celsius

SECTION III – PHYSICAL HAZARDS

STABILITY:	Stable
CONDITIONS TO AVOID:	High heat, Reducing agents
INCOMPATIBILITY (Materials to avoid):	Contact with magnesium metal may generate dangerous levels of hydrogen gas.
HAZARDOUS DECOMPOSITION PRODUCTS:	Above 600 degrees Celsius sulfur dioxide may be evolved, none at normal process temperatures.

MATERIAL SAFETY DATA SHEET

HAZARDOUS POLMERIZATION: Will not occur.

MATERIAL SAFETY DATA SHEET

SECTION IV - FIRE & EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMIT (LOWER): N/A

FLAMMABLE LIMIT (UPPER): N/A

FIRE EXTINGUISHING MEDIA: Does not burn or support combustion.

SPECIAL PROCEDURES: Use extinguisher media for surrounding fire, CO2, dry chemical or water. Avoid direct water stream on molten material (splattering occurs).

UNUSUAL FIRE/EXPLOSION HAZARDS: Heated above 110 degrees Celsius will melt and flow. Sealed containers may rupture when heated due to release of water from crystals. Material is acidic when dissolved in water, contact with magnesium metal may evolve hydrogen gas. Anhydrous cupric sulfate formed on water loss (white color). Anhydrous salt will ignite hydroxylamine if present. At temperatures greater than 600 degrees Celsius decomposes to cupric oxide and sulfur dioxide.

SECTION V - HEALTH HAZARD DATA

ACUTE: Corrosive: Causes eye damage and irritation to the skin and mucous membranes. Harmful or fatal if swallowed.

CHRONIC: Very rare, except in individuals with Wilson's disease.

SIGNS AND SYMPTOMS OF EXPOSURE: Localized skin discoloration, itching, eye irritation, ulceration of nasal septum may occur, repeated or prolonged skin contact may cause dermatitis.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Wilson's disease (Retains and stores copper excesssively).

CHEMICAL LISTED AS CARCINOGEN: No

SECTION VI - SPECIAL PROTECTION

EYE PROTECTION: Chemical goggles in splash hazard areas.

RESPIRATORY PROTECTION: NIOSH/MSHA approved respirator for toxic dusts.

VENTILATION: Yes

LOCAL EXHAUST: Yes

PROTECTIVE GLOVES: Rubber

OTHER PROTECTIVE EQUIPMENT: Eye wash station should be available in work areas.

WORK/HYGENIC PRACTICES: Observe good personal hygiene practices. Wash hands before eating.

SECTION VII - HAZARDOUS COMPONENTS OF MIXTURES

MATERIAL	PERCENT
Copper Sulfate Pentahydrate, CAS # 7758-99-8	99%
Inert Ingredients: *	
Inert Ingredients may contain: Cupric Sulfate ($CuSO_4$) Blue Vitriol	1%

MATERIAL SAFETY DATA SHEET

SECTION VIII - EMERGENCY & FIRST AID PROCEDURES

IF INGESTED: May be fatal if swallowed. Do not induce vomiting. Get medical attention.

IF INHALED: Move to fresh air. Administer CPR if necessary.

IF ON SKIN: Flush with large amounts of water at least 15 minutes. Remove contaminated clothing. Get medical attention if irritation persists.

IF IN EYES: Flush with large amounts of water for at least 15 minutes. Hold eyelids open during flushing. Get medical attention if irritation persists.

Treat most urgent symptoms first; cessation of breathing, eye injury, skin contact, shock. In all cases seek medical assistance.

SECTION IX - SPILLAGE OR LEAKAGE PROCEDURES

Sweep up crystals, vacuum is preferred. If spilled solution is in a confined area, introduce lime or soda ash to form insoluble copper salts and dispose of in an approved landfill. Prevent accidental entry of solution into streams and other water bodies.

SECTION X - WASTE DISPOSAL METHODS

Contact appropriate local, state and federal officials.

SECTION XI - ADDITIONAL PRECAUTIONS

Do not contaminate water, food, or feed by storage or disposal.

Storage: Store in closed containers in a cool, dry, well ventilated place away from heat sources and reducing agents. Use good housekeeping practices to prevent dust accumulation.

Container Disposal: Do not reuse container. Securely wrap original container in several layers of newspaper and discard in trash.

Environmental Hazards: This product is toxic to fish. Direct application of Copper Sulfate to water may cause a significant reduction in populations of aquatic invertebrates, plants and fish. Do not treat more than one-half of lake or pond at one time in order to avoid depletion of oxygen from decaying vegetation. Allow 1 to 2 weeks between treatments for oxygen levels to recover. Trout and other species of fish may be killed at application rates recommended on this label especially in soft or acid waters. However, fish toxicity generally decreases when the hardness of the water increases. Do not contaminate water by cleaning of equipment of disposal of wastes. Consult local State Fish and Game Agency before applying this product to public waters. Permits may be required before treating such waters.

SECTION XII - COMMENTS

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representation as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s). A request has been made to the manufacturer to approve the contents of this material safety data sheet. Upon receipt, a new MSDS will be made available.