Material Safety Data Sheet

Martrex, Inc.

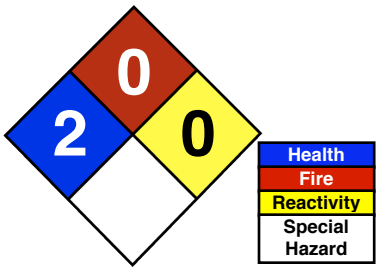
Section 1: Chemical Product and Company Information

Product name: Copper Sulfate Pentahydrate
Reference Number:
Supplier/ Further Information: Martrex, Inc.

P. O. Box 1709
14525 Highway 7
Minnetonka, Minnesota 55345-3793

Phone: 952/933-5000
Toll Free: 800/328-3627
FAX: 952/933-1889

Web: www.martrexinc.com



For Rating Explanation see Section 16

EPA Registration Number: 46923-4
CAS#: 7758-99-8
Chemical Name: Carbonyldiamine
Synonyms: Blue Vitrol, Bluestone, Cupric Sulfate
Chemical Family: Inorganic Salts
MSDS Number: n/a

24 Hour Emergency Phone - Chemtrec Transport: 1-800-424-9300; Medical: 1-800-441-3637

Section 2: Composition/Information on Ingredients

Component	SARA Listed Hazardous?	CAS#	%	RTECS#	Other Limits
1. Copper Sulfate Pentahydrate	Yes	7758-99-8	~100%	no data	See Sections 11,12,15

Comp.	OSHA PEL	OSHA STEL	OSHA CEIL	ACGIH TLV	ACGIH STEL	ACGIH CEIL
1. (above)	See Section 7, 8	See Section 7, 8	See Section 7, 8	See Section 7, 8	See Section 7, 8	See Section 7, 8

Section 3: Hazards Identification

Emergency Overview: **Warning!** Harmful if swallowed. Causes digestive and respiratory tract irritation with possible burns. Causes eye and skin irritation and possible burns. Hygroscopic. Mutagen. Possible sensitizer.

NFPA: Health: **2** Flammability: **0** Reactivity: **0**

Potential Health Effects: Hazardous in case of skin contact, of eye contact, of ingestion, of inhalation.

Primary Routes of Exposure / Entry: Skin contact, Inhalation, Eye contact.

Target Organs: blood, cardiovascular system

Acute Exposure Symptoms

Inhalation (breathing): May cause ulceration and perforation of the nasal septum if inhaled in excessive quantities. Causes respiratory tract irritation with possible burns.

Eye Contact: Exposure to particulates or solution may cause conjunctivitis, ulceration, and corneal abnormalities. Causes eye irritation and possible burns.

Skin Contact: May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause itching eczema.

Ingestion (swallowing): Harmful if swallowed. May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. Ingestion of large amounts of copper salts may cause bloody stools and vomit, low blood pressure, jaundice and coma. Ingestion of copper compounds may produce systemic toxic effects to the kidney and liver and central nervous excitation followed by depression.

Chronic Exposure Symptoms: Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. May cause anemia and other blood cell abnormalities. Individuals with Wilson's disease are unable to metabolize copper. Thus, copper accumulates in various tissues and may result in liver, kidney, and brain damage. Laboratory experiments have resulted in mutagenic effects. May cause allergic skin reaction in some individuals. Chronic copper poisoning in man is recognized in the form of Wilson's disease.

Medical Conditions Aggravated By Long-Term Exposure: Wilson's disease, among others.

Carcinogenicity Data: Inadequate data available

NTP: not listed **OSHA:** not listed **IARC Monograph:** not listed **ACGIH:** not listed **NIOSH:** not listed

Also See: Section 11 for more Toxicological information

Section 4: First Aid Measures

Inhalation: Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. **Get Medical Attention.**

Eye Exposure: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. **Get Medical Attention.**

Skin Exposure: **Get Medical Attention.** Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. **Get Medical Attention.**

NOTE TO THE PHYSICIAN: Individuals with Wilson's disease are more susceptible to chronic copper poisoning.

Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel.

Section 5: Fire Fighting Measures

Flammability Classification: Copper Sulfate does not burn nor will it support combustion.

A Flash Point: no data

Auto-ignition Temperature: no data

Lower explosion limit (LEL): no data

Upper explosion limit (UEL): no data

Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Unusual Fire and Explosive Hazards: This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

Hazardous Decomposition Materials: If dry heated above 600 degrees C, SO2 is evolved. If water is used it will solubalize the Copper Sulfate and care should be taken to keep such water out of streams or other water bodies.

Special Procedures: no data

Fire-Fighting Instructions: As in any fire, wear a self-contained breathing apparatus in pressure demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is noncombustible. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

Personal Protective Equipment: Fire fighters should use NIOSH approved self-contained breathing apparatus and full protective equipment when fighting chemical fires.

Section 6: Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill:

Spill and Leak Personal Procedures: Use proper personal protective equipment as indicated in Section 8.

Containment of Spill: Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Place under an inert atmosphere.

Cleanup and Disposal of Spill: Vacuum or sweep up material and place into a suitable disposal container

Environmental and Regulatory Reporting: Waste must be disposed of in accordance with state and local environmental control regulations. See Sections 15 for regulatory requirements.

Section 7: Handling and Storage

Minimum/maximum Storage Temperature: Store in cool area.

Handling: TWA = 1 mg/L for Copper Sulfate. When TWA exceeds this limit in the workplace, provide appropriate ventilation. Wear an approved respirator for dusts or mists: MSHA/NIOSH approved number prefix TC-21C, or a NIOSH approved respirator with any R, P or HE filter. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.

REGULATORY REQUIREMENTS: See Section 2 and 8 for employee exposure controls and Section 15 for other regulatory requirements.

Section 8: Exposure Controls / Personal Protection

Ventilation / Engineering Protection: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. TWA = 1 mg/L for Copper Sulfate. When TWA exceeds this limit in the workplace, provide appropriate ventilation. Wash thoroughly after handling. Use adequate ventilation to keep airborne concentrations low.

Respiratory Protection (specify type): Wear an approved respirator for dusts or mists: MSHA/NIOSH approved number prefix TC-21C, or a NIOSH approved respirator with any R, P or HE filter. A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Eye Protection: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin Protection: Wear appropriate protective gloves to prevent skin exposure.

Other Protective Clothing and Equipment: Wear appropriate protective clothing to prevent skin exposure.

Hygienic Work Practices: Clean protective equipment before reuse. Wash after handling. Wash clothing and clean shoes before reuse.

Section 9: Physical and Chemical Properties

Chemical Name: Copper Sulfate Pentahydrate
Percent Equivalent $CuSO_4 \cdot 5H_2O$: ~100%
Physical State: Crystals
Color and Appearance: Blue
Odor: Odorless
Odor Threshold: no data
pH (10% water)**:** no data
Specific Gravity (water=1)**:** 2.2840g/cm^3
Vapor Pressure: 7.3 mm Hg @ 25ºC
Vapor Density (Air = 1)**:** no data
Density: no data
Bulk Density: no data
Volatiles by Volume: no data
Boiling Point: 150ºC
Freezing / Melting Point: 110ºC
Evaporation Rate: negligible
Solubility in water: Soluble
Viscosity: no data
Other Solubilities: no data

Chemical Formula: $CuSO_4 \cdot 5H_2O$
Formula Wt: 249.68

Section 10: Stability and Reactivity

Chemical Stability (under normal conditions of storage, handling, use)**:** Stable__X__ Unstable____
Hazardous Polymerization: May Occur____
Has Not Been Repoted__X__
Conditions to Avoid: High temperatures, incompatible materials, dust generation, exposure to air, exposure to moist air or water.
Chemical Incompatibility and Materials to Avoid: Moisture, air, steel, finely powdered metals, hydroxylamine, magnesium, hydrazine, nitromethane.
Hazardous Decomposition Products: Oxides of sulfur, irritating and toxic fumes and gases, oxides of copper, copper fumes.

Section 11: Toxicological Information

Acute Data: Harmful if swallowed. Causes digestive and respiratory tract irritation with possible burns. Causes eye and skin irritation and possible burns. Hygroscopic. Mutagen. Possible skin sensitizer.
Acute Oral LD_{50}: (Rat)= 300 mg/kg.
Acute Dermal LD_{50}: (Rat)= >2 mg/kg
Additional Information: no data
Chronic Data
Mutagenicity Data: DNA Inhibition: Human, Lymphocyte = 76 umol/L.; Unscheduled DNA Synthesis: Rat, Liver = 31 umol/L.; Cytogenetic Analysis: Rat, Ascites tumor = 300 mg/kg.; Micronucleus Test: Intraperitoneal, mouse = 5 mg/kg.
Other Effects on Humans: no data

Section 12: Ecological Information

Eco-acute Toxicity:
Organisms/Fish Toxicity: Fish: Rainbow trout: LC50 = 0.1-2.5 mg/L; 96 Hr; Unspecified Harlequin fish: LC50=0.1-2.5 mg/L; 96 Hr; Unspecified Goldfish: LC50 = 0.1-2.5 mg/L; 96 Hr; Unspecified flea Daphnia: EC50 = 0.24 mg/L; 48 Hr; Unspecified In soil, copper sulfate is partly washed down to lower levels, partly bound by soil components, and partly oxidatively transformed. Copper has a strong affinity for hydrous iron and manganese oxides, clays, carbonate minerals, and organic matter. Sorption to these materials ... suspended in the water column & in the bed sediments, results in relative enrichment of the solid phase and reduction in dissolved levels.
Environmental Fate:
Toxicity: Copper is accumulated by plants and animals, but it does not appear to biomagnify from plants to animals. This lack of biomagnification appears common with heavy metals. In air, copper aerosols (in general) have a residence time of 2 to 10 days in an unpolluted atmosphere and 0.1 to > 4 days in polluted, urban areas.
Physical Degradation Products: No evidence was found to indicate that there is any biotransformation proces for copper compounds which would have a significant bearing on the fate of copper in aquatic environments.

Section 13: Disposal Considerations

Disposal Procedures: May be dangerous if it enters the public water systems. Follow local regulation. Toxic to fish and plants. Fish toxicity critical concentration is 235 mg/L and plant toxicity is 25 mg/L.
RCRA Hazardous Waste Number: no data
Best demonstrated available treatment: no data

Container Cleaning And Disposal: no data
Disposal Regulatory Requirements: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

Section 14: Transport Information

US DOT Transportation Data (49 CFR 172.101):
Proper Shipping Name: Cupric Sulfate; RQ, Environmentally Hazardous Substance, Solid, N.O.S.
Hazard Class: 9
ID NO.: UN3077
Packing Group: III
Additional Info: no data
Canada TDG:
Proper Shipping Name: Cupric Sulfate
Hazard Class: 9.2
ID NO.: UN9109
Packing Group: II
Additional Info: Regulated Limit 5 kg

Section 15: Regulatory Information

TSCA: not listed; it is a hydrate and exempt from TSCA Inventory requirements (40CFR720.3(u)(2)).
DSL (Canadian)**:** not listed
WHMIS Classification: D1B,D2A
EPA Regulations:
TSCA 8(b) inventory: no data
RCRA Hazardous Waste Number: no data
CERCLA Hazardous Substance: no data
CERCLA Reportable Quantity no data
SARA 311/312 Codes: This material contains Copper (II) sulfate pentahydrate (listed as ** undefined **), 100%, (CAS#7758-99-8) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
SARA 302 EHS: no RQ
SARA 302 EHS Threshold Planning Quantity: no TPQ
Clean Air Act: This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.
State Regulations: Since state and local laws vary, consult your attorney or appropriate regulatory officials for information relating to spill reporting.

Section 16: Other Information

ACGIH - American Conference of Governmental Industrial Hygienists
ANSI - American National Standards Institute
CAS - Chemical Abstracts Service
CERCLA - Comprehensive Environmental Response, Compensation & Liability Act of 1980
CFR - Code of Federal Regulations
CHEMTREC - Chemical Transportation Emergency Center
DOT - U.S. Department of Transportation

DSL - Canadian Domestic Substance List
EHS - Extremely Hazardous Substance
EPA - U.S. Environmental Protection Agency
HMIS - Hazardous Material Identification System
IARC - International Agency for Research on Cancer
LEL/UEL - Lower and Upper Explosive Limit
mg/m³ - Milligrams per cubic meter
MSDS - Material Safety Data Sheet
NAERG - North American Emergency Response Guidebook
NIOSH - National Institute of Occupational Safety and Health
NFPA - National Fire Protection Association
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit (set by OSHA)
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act of 1976
SARA - Superfund Amendments and Reauthorization Act
TDG (Canadian)**:** Transport of Dangerous Goods Regulations
TLV - Threshold Limit Value (set by ACGIH)
TWA - 8-hour Time Weighted Average
TSCA - US Toxic Substance Control Act
WHMIS - Workplace Hazardous Material Information System

NFPA Rating Explanation Guide

Rating Number	Health Hazard	Flamability Hazard	Instability Hazard
4	Can be lethat	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambiant temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambiant temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No Hazard	Will not burn	Stable

Rating Symbol	Special Hazard
ALK	Alkaline
ACID	Acidic
BIO	BioHazard
COR	Strong Corrosive
CRYO	Cryogenic
OXY	Oxidizer
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water or oxidizer

This chart for reference only - For complete specifications consult the NFPA Standard

MSDS Issue Date: n/a
Revised Date: 5-21-09
Supersedes: n/a

Disclaimer: Martrex, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. **MARTREX, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MARTREX, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**