# Safety Data Sheet

Martrex, Inc.

## Section 1: Chemical Product and Company Information

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


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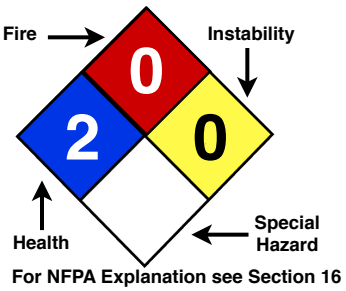


For NFPA Explanation see Section 16

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

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

## Section 2: Hazards Identification

**Emergency Overview**

**Danger! Toxic if swallowed. Causes digestive and respiratory tract irritation with possible burns. Causes eye and skin irritation and possible burns. Hygroscopic. Mutagenic: Suspected of causing genetic defects. Possible sensitizer.**

**GHS Classification** (Global Harmonized Classification see Section 16)**:**

| | | |
|---|---|---|
| Germ Cell Mutagenicity | **Category 2** | (H341) |
| Acute toxicity, Oral | **Category 3** | (H301) |
| Skin irritation | **Category 2** | **(**H315) |
| Eye irritation | **Category 2** | (H319) |
| Acute aquatic toxicity | **Category 1** | (H400) |
| Chronic aquatic toxicity | **Category 1** | **(**H410) |

**GHS Label, Hazards and Precautionary Statements**

**GHS Pictogram:**

(GHS Pictogram Hazards Definitions See Section 16)

**Signal Word:** **Danger**

**Hazard Statements:**

| | |
|---|---|
| Suspected of causing genetic defects. | (H341) |
| Toxic if swallowed. | (H301) |
| Causes skin irritation. | (H315) |
| Causes serious eye irritation. | (H319) |
| Very toxic to aquatic life with long lasting effects. | (H410) |

**Precautionary Statements:**

**Prevention:**

Obtain special instructions before use. (P201)
Do not handle until all safety precautions have been read and understood. (P202)
Wash skin thoroughly after handling. (P264)
Do not eat, drink or smoke when using this product. (P270)
Avoid release to the environment. (P273)
Wear protective gloves, protective clothing, eye protection, face protection. (P280)

**Response:**

**IF EXPOSED OR CONCERNED,** Get Medical Advice/Attention. (P308+P313)
**IF SWALLOWED:** Rinse mouth. **Immediately call a POISON CENTER or doctor/** physician. (P301+P310+P330)
**Specific treatment:** see Section 4: First Aid Measures, Ingestion on this label. (P321)
**IF ON SKIN:** Wash with plenty of soap and water. (P302+P352)
**Specific treatment:** see Section 4: First Aid Measures, Skin Exposure on this label. (P321)
**If Skin Irritation Occurs:** Get medical advice/ attention. (P332+P313)
**Take off contaminated clothing** and wash before reuse. (P362+ P364)
**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338)
**If eye irritation persists:** Get medical advice/ attention. (P337+P313)
**Collect spillage.** (P391)

**Storage:**

Store locked up. (P405)

**Disposal Considerations:**

Dispose of content/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. (P501)

**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 3: Composition/Information on Ingredients

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

| OSHA PEL | OSHA STEL | OSHA CEIL | ACGIH TLV | ACGIH STEL | ACGIH CEIL |
|---|---|---|---|---|---|
| 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 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

**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 3 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:** CAS# 7758-99-8: acute, chronic
**SARA 313:** 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

### Acronyms

**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
**CPR -** Controlled Products Regulations
**CWC -** Chemical Weapons Convention
**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
**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
**SDS** - Safety Data Sheet
**STEL -** Concentration to which workers can be exposed continuously for a **short** period of time without suffering from irritation, irreversible tissue damage or narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency.
**TDG** (Canadian)**:** Transport of Dangerous Goods Regulations
**TLV** - Threshold Limit Value (set by ACGIH)
**TWA** - 8-hour Time Weighted Average

## GHS Pictograms and Hazards

| Health Hazard | Flame | Exclamation Mark |
|---|---|---|
|  |  |  |
| • Carcinogen<br>• Mutagenicity<br>• Reproductive Toxicity<br>• Respiratory Sensitizer<br>• Target Organ Toxicity<br>• Aspiration Toxicity | • Flammables<br>• Pyrophorics<br>• Self-Heating<br>• Emits Flammable Gas<br>• Self-Reactives<br>• Organic Peroxides | • Irritant (skin and eye)<br>• Skin Sensitizer<br>• Acute Toxicity (harmful)<br>• Narcotic Effects<br>• Respiratory Tract Irritant<br>• Hazardous to Ozone Layer (Non-Mandatory) |
| **Gas Cylinder** | **Corrosion** | **Exploding Bomb** |
|  |  |  |
| • Gases Under Pressure | • Skin Corrosion/ Burns<br>• Eye Damage<br>• Corrosive to Metals | • Explosives<br>• Self-Reactives<br>• Organic Peroxides |
| **Flame Over Circle** | **Environment** (Non-Mandatory) | **Skull and Crossbones** |
|  |  |  |
| • Oxidizers | • Aquatic Toxicity | • Acute Toxicity (fatal or toxic) |

## NFPA Rating Explanation Guide

| Rating Number | Health Hazard | Flammability Hazard | Instability Hazard |
|---|---|---|---|
| 4 | Can be lethal | 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 ambient temperatures | May explode at high temperature or shock |
| 2 | Can cause temporary incapacitation or residual injury | Must be heated or high ambient 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*

**24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation**
**1-800-441-3637 Medical**

**TSCA** - US Toxic Substance Control Act
**WHMIS -** Workplace Hazardous Material Information System

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