

# Material Safety Data Sheet

## Copper(II) sulfate pentahydrate

ACC# 05690

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Copper(II) sulfate pentahydrate

**Catalog Numbers:** S73250, S73253, S73268, S73268-1, S73269, S73269-1, S73269-3, S73271, S93225A, BP346-500, C489-1, C489-10, C489-500, C490-10, C490-3, C493-10, C493-100, C493-3, C493-500, C494-12, C494-212, C494-500, C494250LB, NC9996491, S73250-1, XXC493200LB

**Synonyms:** Blue Vitriol.

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7758-99-8	Copper(II) sulfate pentahydrate	100	unlisted

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: blue crystals.

**Warning!** Harmful if swallowed. Causes digestive and respiratory tract irritation with possible burns. Causes eye and skin irritation and possible burns. Air sensitive. Hygroscopic (absorbs moisture from the air). Severe marine pollutant. Possible sensitizer.

**Target Organs:** Blood, kidneys, liver.

#### Potential Health Effects

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

**Skin:** 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:** 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.

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

**Chronic:** 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.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of 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.

**Inhalation:** Remove from exposure and move 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.

**Notes to 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

**General Information:** 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.

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

**Flash Point:** Not applicable.  
**Autoignition Temperature:** Not applicable.  
**Explosion Limits, Lower:**Not available.  
**Upper:** Not available.  
**NFPA Rating:** (estimated) Health: 2; Flammability: 0; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.  
**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Place under an inert atmosphere.

## Section 7 - Handling and Storage

**Handling:** 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. 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.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Copper(II) sulfate pentahydrate	none listed	1 mg/m <sup>3</sup> TWA (as Cu except Copper fume) (listed under Copper compounds, n.o.s.).	none listed
Cupric sulfate anhydrous	none listed	1 mg/m <sup>3</sup> TWA (as Cu except Copper fume) (listed under Copper compounds, n.o.s.).	none listed

**OSHA Vacated PELs:** Copper(II) sulfate pentahydrate: No OSHA Vacated PELs are listed for this chemical. Cupric sulfate anhydrous: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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 respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** blue

**Odor:** Odorless

**pH:** Not available.

**Vapor Pressure:** 7.3 mm Hg @ 25 deg C

**Vapor Density:** Not available.

**Evaporation Rate:** Negligible.

**Viscosity:** Not available.

**Boiling Point:** 150 deg C (dec)

**Freezing/Melting Point:** 110 deg C (dec)

**Decomposition Temperature:** Not available.

**Solubility:** Soluble.

**Specific Gravity/Density:** 2.2840g/cm<sup>3</sup>

**Molecular Formula:** CuO<sub>4</sub>S<sub>5</sub>H<sub>2</sub>O

**Molecular Weight:** 249.68

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions. Air sensitive.

**Conditions to Avoid:** High temperatures, incompatible materials, dust generation, exposure to air, exposure to moist air or water.

**Incompatibilities with Other Materials:** 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.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 7758-99-8: GL8900000**CAS#** 7758-98-7: GL8800000**LD50/LC50:**

CAS# 7758-99-8:

Oral, mouse: LD50 = 43 mg/kg;

Oral, rat: LD50 = 300 mg/kg;

Skin, rat: LD50 = &gt;2 gm/kg;

CAS# 7758-98-7:

Oral, mouse: LD50 = 369 mg/kg;

Oral, mouse: LD50 = 87 mg/kg;

Oral, rat: LD50 = 300 mg/kg;

Oral, rat: LD50 = 960 mg/kg;

**Carcinogenicity:**

CAS# 7758-99-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 7758-98-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found**Teratogenicity:** No information found**Reproductive Effects:** No information found**Mutagenicity:** 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.**Neurotoxicity:** No information found**Other Studies:****Section 12 - Ecological Information****Ecotoxicity:** Fish: Rainbow trout: LC50 = 0.1-2.5 mg/L; 96 Hr; Unspecified Fish: Harlequin fish: LC50 = 0.1-2.5 mg/L; 96 Hr; Unspecified Fish: Goldfish: LC50 = 0.1-2.5 mg/L; 96 Hr; Unspecified Water 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:** 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:** No evidence was found to indicate that there is any biotransformation process for copper compounds which would have a significant bearing on the fate of copper in aquatic environments.**Other:** Severe marine pollutant.**Section 13 - Disposal Considerations**

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.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.**Section 14 - Transport Information**

	US DOT	Canada TDG
<b>Shipping Name:</b>	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTAN (CUPRIC SULFATE)
<b>Hazard Class:</b>		9
<b>UN Number:</b>		UN3077
<b>Packing Group:</b>		III

**Section 15 - Regulatory Information****US FEDERAL****TSCA**

CAS# 7758-99-8 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 7758-98-7 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health &amp; Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 7758-98-7: 10 lb final RQ; 4.54 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 7758-99-8: immediate, delayed.

CAS # 7758-98-7: immediate.

**Section 313**

This material contains Copper(II) sulfate pentahydrate (listed as Copper compounds, n.o.s.), 100%, (CAS# 7758-99-8) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Cupric sulfate anhydrous (listed as Copper compounds, n.o.s.), -, (CAS# 7758-98-7) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

CAS# 7758-98-7 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA. CAS# 7758-99-8 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 7758-98-7 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7758-99-8 can be found on the following state right to know lists: California, (listed as Copper compounds, n.o.s.), Pennsylvania, (listed as Copper compounds, n.o.s.).

CAS# 7758-98-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN N

**Risk Phrases:**

R 22 Harmful if swallowed.

R 36/38 Irritating to eyes and skin.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 22 Do not breathe dust.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 7758-99-8: 2

CAS# 7758-98-7: 2

**Canada - DSL/NDSL**

CAS# 7758-98-7 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7758-99-8 (listed as Copper compounds, n.o.s.) is listed on the Canadian Ingredient Disclosure List.

CAS# 7758-98-7 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 7/09/1999

**Revision #4 Date:** 9/22/2004

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*