



Copper Sulfate Pentahydrate

Date Prepared: April 11, 2000



NFPA RATING

HEALTH	3
FLAMMABILITY	0
REACTIVITY	0
PROTECTIVE EQUIPMENT	

HMIS RATING

MATERIAL SAFETY DATA SHEET

SECTION I. PRODUCT IDENTIFICATION

Product Name: Copper Sulfate Pentahydrate

Manufacturer/Vendor Information: PHELPS DODGE REFINING CORP. P.O Box 20001 El Paso, Texas

24-Hour Emergency Phone: (800)424-9300 Chemtrec

Other Information Phone: (915)778-9881

SECTION II. COMPOSITION / INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	Exposure Limits	% by wt.
7758-99-8	Copper sulfate pentahydrate (CuSO ₄ •5H ₂ O), (Cupric sulfate), (Blue Vitriol), (Bluestone)	ACGIH TLV TWA: 1.0 mg/m ³ (as copper dust/mist) OSHA PEL TWA: 1.0 mg/m ³ (as copper dust/mist)	99
	Anhydrous Cupric Sulfate (CAS# 7758-98-7)	Phelps Dodge Triangle Brand Copper Sulfate Copper Sulfate Pentahydrate (CAS 7758-99-8) Contains copper sulfate Contains water of crystallization Metallic copper equivalent	=99% =63.3% =35.7% =25.2%

SECTION III. HAZARDS IDENTIFICATION

Emergency Overview: Odorless, transparent blue crystals, granules or powder. Can cause irreversible eye damage and severe skin irritation. Harmful if swallowed or absorbed through the skin. Avoid breathing mist or dust and contact with skin, eyes or clothing. May cause skin sensitization reactions in certain individuals.

Route(s) of Entry: Inhalation, eye, skin and ingestion.

Acute Exposure: Can cause skin, eye and respiratory irritation.

Chronic Exposure: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis.

Carcinogenicity (NTP) (IARC) (OSHA): Not listed.

Eye: Can cause severe eye irritation and may result in irreversible eye damage.

Skin Contact: Can cause severe skin irritation. May cause localized discoloration of the skin.

Inhalation: Can result in irritation of the upper respiratory tract and in excessive quantities may cause ulceration and perforation of the nasal septum.

Ingestion: Can result in digestive tract irritation with abdominal pain.

SECTION IV. FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.

Skin: Remove contaminated clothes and shoes; immediately wash skin with soap and plenty of water and get medical attention.

Ingestion: Drink promptly a large quantity of milk, egg white, gelatin solution, or if they are not available, large quantities of water. Avoid alcohol. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

SECTION V. FIRE FIGHTING MEASURES

Flash Pt:	Not available
Flammable Limits in Air-Lower:	Not available
Flammable Limits in Air – Upper:	Not available
Auto Ignition Temperature:	Not available
Fire Fighting Extinguishing Media:	Does not burn or support combustion. Use extinguishing media appropriate for surrounding fire (CO ₂ , dry chemical or water).
Fire Fighting Equipment:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Fire Fighting Instructions:	Evacuate area and fight fire from a safe distance.
Fire and Explosion Hazards:	Sealed containers may rupture when heated due to release of water from crystals.
Unusual Hazards:	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.

SECTION VI. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Use clean-up methods that avoid dust generation (vacuum, wet). Wear a NIOSH or MSHA approved respirator if dust will be generated in clean-up. Use protective clothing if skin contact is likely. If spilled solution is in a confined area, introduce lime or soda ash to form insoluble copper salts and dispose of by approved method. Prevent accidental entry of solution into streams and other water bodies. Shovel any spills into plastic bags and seal with tape. Copper sulfate solution may deteriorate concrete.

SECTION VII. HANDLING AND STORAGE

Signal Word: Danger.

Handling Information: Avoid breathing dust or solution mist. Sweep up crystals or powder, vacuum is preferred. Eye wash stations should be available in work areas. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage Information: Store in closed containers in a cool, dry, well-ventilated area away from heat sources and reducing agents. Store copper sulfate in stainless steel, fiberglass, polypropylene, PVC's or plastic equipment. Keep away from galvanized pipe and nylon equipment. If container or bag is damaged, place the container or bag in a plastic bags. Use good housekeeping practices to prevent dust accumulation.

SECTION VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Use adequate general or local ventilation to keep airborne concentrations below the exposure limits.

Eye Protection: Use safety glasses with side-shields or goggles.

Skin Protection: Use protective clothing to prevent repeated or prolonged skin contact. Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, shoes plus socks, and protective eyewear. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with product's concentrate. Do not reuse them. Keep and wash PPE separately from other laundry.

Respiratory Protection: A respiratory protection program that meets OSHA 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant respirator use. For concentrations up to 10 times the exposure limit, use NIOSH or MSHA approved half- or full-face, air-purifying respirator. For higher concentrations, consult a professional industrial hygienist.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Transparent blue crystals, granules or powder.
Melting Point:	Decomposition above 110 °C with -4 H ₂ O
Boiling Point:	-5H ₂ O @ 150 °C (760 mmHg)
Decomposition Temperature:	Not available
Density/Specific Gravity:	2.284 @ 15.6 °C
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Solubility in Water:	83.1 g/100 cc water @ 30 °C
Molecular Weight:	249.68

SECTION X. STABILITY AND REACTIVITY

Stability: Stable.

Incompatibility: Acetylene gas, aluminum powder, hydroxylamine, magnesium, moist air. Contact with magnesium metal can generate dangerous levels of hydrogen gas.

Hazardous Decomposition Products: At temperatures >600 °C material decomposes to cupric oxide and sulfur dioxide.

Hazardous Polymerization: Will not occur.

SECTION XI. TOXICOLOGICAL INFORMATION

Toxicology Tests: (Triangle Brand Copper Sulfate Crystal)

Test: 1	Test: 3
LD/LC: LD ₅₀	LD/LC: LC ₅₀
Test Type: Acute	Test Type: Acute
Test Route: Percutaneous	Test Route: Inhalation
Test Species: Rabbit	Test Species: Rats
Results Amounts: >8.0 g/kg	Results Amounts: >2.95 mg/L

Test: 2
LD/LC: LD₅₀
Test Type: Acute
Test Route: Oral
Test Species: Rat
Results Amounts: 472.5 mg/kg

Primary Eye Irritation: Corrosive, irreversible eye damage

Primary Skin Irritation: No skin irritation.

Subacute dietary LC₅₀: >10,000 ppm (quail and duck).

96 hr acute toxicity LC₅₀: 0.65 ppm (bluegill), 0.056 ppm (trout), 16 ppm (pink shrimp)

48 hr EC₅₀: 54 ppb (eastern oysters)

48 hr LC₅₀: 17 ppm (pink shrimp), 600 ppb (daphnia)

24 hr LC₅₀: 6.9 ppm (blue crab), 600 ppb (daphnia)

Carcinogenic: Not listed by NTP, IARC or OSHA.

Additional Information: Inhalation of dust and mists of copper salts can result in irritation of nasal mucous membranes, sometimes of the pharynx and, on occasion ulceration with perforation of the nasal septum. Exposure to copper dust causes discoloration of the skin.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed. Wilson's disease or G6PD deficiency (individual who absorbs, retains and stores copper) can be aggravated by excessive exposure. Symptoms may include nausea, vomiting, epigastric pain, diarrhea, dizziness, jaundice, and general debility.

SECTION XII. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Improper disposal is a violation of Federal law. Do not reuse empty container. If allowed by State and local authorities, dispose of container in a sanitary landfill or by incineration.

SECTION XIII. TRANSPORT INFORMATION

<u>Proper Shipping Name:</u>	<u>Technical Name (If N.O.S.):</u>	<u>Hazard Class:</u>	<u>ID:</u>	<u>PG:</u>
DOT: <i>Environmentally Hazardous Substance, Solid, n.o.s., (Cupric Sulfate)*</i> Reportable Quantity (RQ) = 10 pounds (4.54 kg)		9	UN3077	III

*Applicable when product is shipped in packaging of 10 pounds or greater. If shipped in less than 10 pound packaging it is not regulated by DOT Hazardous Material Regulations.

SECTION XIV. REGULATORY INFORMATION**US Federal**

Federal Drinking Water Standards: (*Copper*) EPA 1300µg/L (action level), 1000 µg/L

Clean Water Act: (*Copper*) 5.6 µg/L as a 24-hour average in freshwater; (*Copper*) 4.0 µg/L as a 24-hour average and not in excess of 23 µg/L at any time in saltwater.

TSCA: Listed

EPCRA, SARA Title III, Section 313 (40 CFR 372) Chemicals subject to reporting requirements (see Section II for CAS number and percentage in mixture): (*Copper*) >1%.

CERCLA Hazardous Substances: RQ is not assigned to the broad class of copper compounds.

DOT: RQ 10 pounds (4.54 kg), See Section XIII TRANSPORT INFORMATION

SECTION XV. OTHER INFORMATION

Prepared By:	Department of Occupational Health and Safety Phelps Dodge Corporation
Reason for Revision:	Revised statements in SECTION I; minor formatting changes

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