



Titanium, Mineral & Chemicals

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MSDS (Material Safety Data Sheet)

Copper Sulfate Pentahydrate (CuSO₄.5H₂O)

Section 1 : Product and Company Identification

Synonyms: Sulfuric acid, copper salt (1:1) pentahydrate; copper sulfate pentahydrate, cupric sulfate pentahydrate, ; Zinc sulfate, Blue Stone, Blue Vitrol, Roman Vitrol, CuSO₄

CAS No.: 7758-98-7

Molecular Weight: 249.68

Chemical Formula: CuSO₄.5H₂O

HS Number : 2833 25 0000

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Section 2 : Composition/Information on Ingredients

Component : Copper Sulfate

CAS number : 7758-98-7

EC Number (EINECS) : 231-847-6

EC Index Number : 029-004-00-0

Percentage : 100.0 %

Hazardous : Yes

Section 3 : Hazards Identification

EMERGENCY OVERVIEW

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

NFPA Ratings (Scale 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

EC Classification (Assigned):

Xi Harmful, Xi Irritant, R 22-36/38, EC Classification may be inconsistent with independently-researched data.

Color : Blue crystal or slightly Blue colored White.

Physical Form: crystals, amorphous powder

Change in Appearance : hygroscopic

Odor: odorless

Major Health Hazards: harmful if swallowed, respiratory tract irritation, skin irritation, eye irritation(possibly severe)

POTENTIAL HEALTH EFFECTS:

INHALATION:

Short Term Exposure: irritation (possibly severe), metallic taste, digestive disorders, chest pain, difficulty breathing.

Long Term Exposure: same as effects reported in short term exposure.

SKIN CONTACT:

Short Term Exposure : irritation (possibly severe), itching, blood disorders.

Long Term Exposure : same as effects reported in short term exposure.

EYE CONTACT:

Short Term Exposure : irritation (possibly severe), eye damage. burns.

Long Term Exposure : same as effects reported in short term exposure.

INGESTION:

Short Term Exposure : burns, sore throat, metallic taste, digestive disorders, headache, bluish skin color, kidney damage, paralysis, convulsions, coma.

Long Term Exposure : same as effects reported in short term exposure.

CHRONIC EXPOSURE: Chronic exposure may cause fatigue, slow tendon reflexes Intestinal inflammation (with bleeding), diarrhea, blood effects, central nervous system depression, tremors and paralysis of the extremities. Repeated skin or eye contact can cause skin and eye effects.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

Section 4 : First Aid Measures

INHALATION: Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT: Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT: Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: Never make an unconscious person vomit or drink fluids. Give water or milk. If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

ANTIDOTE: calcium disodium edetate/dextrose, intravenous; penicillamine, oral.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage.

Section 5 : Fire Fighting Measures

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Section 6 : Accidental Release Measures

Soil Release: Dig holding area such as lagoon, pond or pit for containment. Cover with plastic sheet or tarp to minimize spreading and protect from contact with water.

Water Release: Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash). Neutralize. Collect spilled material using mechanical equipment.

OCCUPATIONAL RELEASE:

Do not touch spilled material. Stop leak if possible without personal risk.

Small spills: Absorb with sand or other non-combustible material. Collect with absorbent into suitable container. Small dry spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Dike for later disposal. Keep

unnecessary people away, isolate hazard area and deny entry.

Section 7 : Handling and Storage

Store and handle in accordance with all current regulations and standards.
Store in a tightly closed container. Store in a cool, dry place. Ventilation required. Avoid contact with light. Keep separated from incompatible substances

Section 8 : Exposure Controls/Personal Protection

EXPOSURE LIMITS:

CUPRIC SULFATE:

COPPER AND COMPOUNDS (as Cu):

- 0.1 mg/m³ OSHA TWA (fume)
- 1 mg/m³ OSHA TWA (dust) (mist)
- 0.2 mg/m³ ACGIH TWA (fume)
- 1 mg/m³ ACGIH TWA (dust) (mist)
- 0.1 mg/m³ NIOSH recommended TWA 10 hour(s) (fume)
- 1 mg/m³ NIOSH recommended TWA 10 hour(s) (dust) (mist)

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

Measurement Element:

Copper (Cu)

- 5 mg/m³ : Any dust and mist respirator.
- 10 mg/m³ :Any dust and mist respirator. Any supplied-air respirator.
- 25 mg/m³ : Any supplied-air respirator. Any powered, air-purifying respirator with a dust and mist filter.
- 50 mg/m³ : Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter. Any powered, air-purifying respirator with a full facepiece and a high-efficiency particulate filter. Any self-contained breathing apparatus with a full facepiece. Any supplied-air respirator with a full facepiece.
- 100 mg/m³ : Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

Section 9 : Physical and Chemical Properties

PHYSICAL STATE: solid

COLOR: white or blue

CHANGE IN APPEARANCE: hygroscopic

PHYSICAL FORM: amorphous powder, crystals

ODOR: Not available

MOLECULAR WEIGHT: 159.61

MOLECULAR FORMULA: CU-S-O4

BOILING POINT: Not applicable

MELTING POINT: 392 F (200 C)

DECOMPOSITION POINT: 1040 F (560 C)

VAPOR PRESSURE: Not applicable

VAPOR DENSITY: Not applicable

SPECIFIC GRAVITY (water=1): 3.603

WATER SOLUBILITY: 14.3% @ 0 C

PH: 4.0 (0.2 M solution)

VOLATILITY: 0%

ODOR THRESHOLD: Not available

EVAPORATION RATE: Not applicable

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: glycerol, methanol

Slightly Soluble: ethanol

Insoluble: alcohol

Section 10 : Stability and Reactivity

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Avoid generating dust. Keep out of water supplies and sewers.

INCOMPATIBILITIES: amines, metals, oxidizing materials, reducing agents, combustible materials

HAZARDOUS DECOMPOSITION: Thermal decomposition products: oxides of copper, sulfur.

POLYMERIZATION: Will not polymerize.

Section 11 : Toxicological Information

CUPRIC SULFATE:

TOXICITY DATA:

300 mg/kg oral-rat LD50.

LOCAL EFFECTS:

Irritant: inhalation, skin. Corrosive: eye, ingestion.

ACUTE TOXICITY LEVEL:

Toxic: ingestion.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: blood system disorders, kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies.

TUMORIGENIC DATA: Available.

MUTAGENIC DATA: Available.

REPRODUCTIVE EFFECTS DATA: Available.

ADDITIONAL DATA: May be excreted in breast milk.

Section 12 : Ecological Information

ECOTOXICITY DATA:

FISH TOXICITY: 140 ug/L 96 hour(s) LC50 (Mortality) Australian Redtailed Rainbowfi (*Melanotaenia nigrans*).

INVERTEBRATE TOXICITY: 17.3 ug/L 48 hour(s) EC50 (Immobilization) Water flea (*Daphnia magna*).

OTHER TOXICITY: 39 ug/L 96 hour(s) LC50 (Mortality) Frog (*Rana hexadactyla*).

FATE AND TRANSPORT:

BIOCONCENTRATION: 1600 ug/L 14-21 month(s) BCF (Residue) Brown algae (*Ectocarpus siliculosus*) 50 ug/L.

Section 13 : Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section 14 : Transport Information

U.S. DOT 49 CFR 172.101. SHIPPING NAME-UN NUMBER; HAZARD CLASS;
PACKING GROUP;

Environmentally hazardous substances, solid, n.o.s. (cupric
sulfate)-UN3077; 9; III; CLASS 9

Section 15 : Regulatory Information

TSCA	TSCA	Japan	Australia	Korea	DSL	NDSL	Phil
Yes	yes	yes	yes	yes	yes	no	yes