# Copper Sulphate – Material Safety Data Sheet

**Infosafe**  
**AJI WQ**  
**Issue Date** November 2009  

Classified as hazardous according to criteria of NOHSC

## Identification

<table>
<thead>
<tr>
<th><strong>Product Code</strong></th>
<th>AR 00000171</th>
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</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>Copper II Sulphate</td>
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<tr>
<td><strong>Proper Shipping Name</strong></td>
<td>None Allocated</td>
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<tr>
<td><strong>Other Names</strong></td>
<td><strong>Name</strong></td>
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<tr>
<td></td>
<td>Copper II Sulphate</td>
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<tr>
<td></td>
<td>Copper Sulphate Electroplating Grade</td>
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<td></td>
<td>Copper II Sulphate Anhydrous</td>
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<tr>
<td></td>
<td>Blue Copper</td>
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<td>Blue Stone</td>
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<td>Blue vitriol</td>
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<td>Copper (II) sulfate</td>
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<td>Copper sulfate</td>
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<td>Cupric sulfate</td>
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<td>Cupric sulphate</td>
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<td>Sulfate de cuivre</td>
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<td>Copper II sulphate pentahydrate</td>
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<td><strong>Poisons Schedule</strong></td>
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<tr>
<td><strong>Product Use</strong></td>
<td>Used in agriculture as a soil additive, pesticide, feed additive, germicide, leather and textile mordant, pigment, manufacture of batteries, electropolating and electrorefining of copper, medicine, wood and pulp preservative, engraving and lithography, ore, steel and rubber processing, asphalt treatment.</td>
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</tbody>
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Providing an extensive range of Winery, Viticulture and Laboratory Equipment

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PHYSICAL DATA

Appearance    Greyish-white to greenish-white crystals or powder (anhydrous and monohydrate), blue granules or crystals (pentahydrate). Anhydrous and monohydrate copper sulphate are hygroscopic (absorb moisture from the air).

Melting Point  560ºC Decomposes
Boiling Point  Not applicable
Vapour Pressure Not applicable
Specific Gravity 3.60 (anhydrous), 2.29 (pentahydrate) (water = 1)

Flash Point Not applicable (does not burn)
Flamm. Limit LEL Not applicable
Flamm. Limit UEL Not applicable

Solubility in Water Very soluble

OTHER PROPERTIES

Autoignition Temp. Not applicable
Vapour Density Not applicable
PH Value 4.0 (0.2 M @ 4ºC)

Solubility in Organic Soluble in methanol and glycerol, slightly soluble in ethanol

Formula MOLECULAR FORMULA Cu-04-S
STRUCTURAL FORMULA Cu.SO4
CHEMICAL FAMILY Inorganic copper salt

Molecular Weight 159.60 (anhydrous) ; 249.68 (pentahydrate)

Other Information DEHYDRATION :The pentahydrate loses two water molecules of hydration at 30ºC, 2 more at 110ºC and becomes anhydrous by 250ºC.

INGREDIENTS

Ingredients Name CAS Proportion
Copper Sulphate 7758-98-7 100%

Copper sulphate exists in anhydrous form (CuSO4), as a monohydrate (CuSO4.H2O) and as the pentahydrate (CuSO4.5H2O). The pentahydrate is the most common form.

Copper sulphate may contain traces of sulphuric acid as an impurity.

HEALTH HAZARD INFORMATION

HEALTH EFFECTS

Acute-Swallowed Harmful if swallowed. Copper salts impart a metallic taste in mouth. Burning sensation in the throat and repeated vomiting are typical effects. More severe poisonings cause diarrhoea and ulceration of the gastrointestinal tract. Can be fatal.

Acute - Eye Will cause irritation in contact with the eyes. Dilute copper sulphate solutions have been used as topical antibiotics. Copper sulphate particles in the eye could cause local inflammation, tissue destruction (necrosis), corneal opacity and adhesion of the eyelid to the eye. Traces of sulfuric acid impurity may contribute to these effects.

Acute – Skin Will cause irritation in contact with the skin, which will result in redness, itchiness, and possible dermatitis.
HEALTH HAZARD INFORMATION cont……..

HEALTH EFFECTS cont……..

Acute – Inhaled
Will cause irritation to the mucous membrane and upper airways. Dust and mists (copper solutions) may also cause irritation of the nasal passages and throat. Ulceration of the nasal septum is possible, but may be due to traces of sulphuric acid impurities.

Chronic
HEALTH EFFECTS SKIN ; Repeated or prolonged exposure to copper salts can cause irritation, producing itching and redness of the skin. Some individuals may become sensitized to copper sulfate and develop allergic contact dermatitis.

INHALATION ; Repeated inhalation of copper sulfate mists (e.g. Bordeaux mixture) may induce a condition known as ‘vineyard sprayer’s lung’. Greenish-tumours occur in the liver and lungs of afflicted individuals. The disease is asymptomatic until later stages. Symptoms include weakness, malaise, loss of appetite and weight, cough and greenish-brown sputum.

INGESTION ; Chronic occupational exposure to copper sulfate by ingestion is not likely. Symptoms would be like those of Wilson’s disease, which include liver, brain, muscle and kidney disfunction.

CARCINOGENICITY ; Although some individuals afflicted with ‘vineyard sprayers’ lung’developed lung cancer, there is no indication of an increased incidence of cancer due to copper sulfate exposure, per se.

TERATOGENICITY AND EMBROTOXICITY ; There are no reports of teratogenicity or embryotoxicity in humans. Animal studies indicate that a deficiency or embryotoxicity in humans. Animal studies indicate that a deficiency or excess of copper in the body can cause significant harm to developing embryos. The net absorption of copper is limited and embryotoxic levels are unlikely from industrial exposure.

TOXICOLOGICAL SYNERGISTIC MATERIALS ; Information not available.

MUTAGENICITY ; No human data available. Negative or inconclusive results in short-term tests.

POTENTIAL FOR ACCUMULATION ; Copper is an essential element and its level in the body is strictly controlled. Under most conditions, excess copper is excreted in the urine and feces (via the bile).

HEALTH HAZARD COMMENTS ; Copper salts may decrease the toxicity of molybdenum. Zinc salts may decrease the toxicity of copper salts.

FIRST AID

Swallowed
Immediately wash out mouth with water, and then give plenty of water to drink. SEEK IMMEDIATE MEDICAL ATTENTION.

Eye
If in eye(s) wash with copious amounts of water for approximately 15 minutes holding eyelid’s open. Take care not to rinse contaminated water into the non-affected eye. SEEK MEDICAL ATTENTION.

Skin
Remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Wash gently and thoroughly with water and non-abrasive soap. Ensure contaminated clothing is washed before re-use or discard. If contact is more than of minor nature, SEEK MEDICAL ATTENTION.

FIRST AID cont…….
Inhaled
Remove the source of contamination or move the victim to fresh air. Ensure airways are clear and have a qualified person give oxygen through face mask if breathing is difficult. SEEK MEDICAL ATTENTION

First Aid Facilities
Safety showers, eye wash fountains, and normal wash room facilities. Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact. All first aid procedures should be periodically reviewed by a doctor familiar with material and its conditions of use in the workplace.

ADVICE TO DOCTOR

Advice to Doctor
Treat symptomatically or consult poison Information Centre

PRECAUTIONS FOR USE

Other Exposure Info.
SAMPLING AND ANALYSIS Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method.

Eng. Controls
Engineering control methods to reduce hazardous exposures are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification (e.g. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required. Use local exhaust ventilation, and process enclosure if necessary, to control airborne dust or mist. Locate dust collectors outside or where permitted by regulation. Supply sufficient replacement air to make up for air removed by exhaust system.

Handling Precautions
Avoid generating dust and mist. Use dust-tight containers. Prevent accumulations of dust. Use smallest possible amounts in designated areas with adequate ventilation. Have emergency equipment (for spills, leaks, etc.) readily available. Label containers. Keep containers closed when not in use. Empty containers may contain residues which are hazardous.

PERSONAL PROTECTION

Protective Equip.
RESPIRATORY PROTECTION ; The use of a Class P2 full facepiece respirator with replaceable filter complying with AS/NZS 1715 and AS/NZS 1716 is recommended.
EYE PROTECTION ; The use of face shields, chemical goggles, or safety glasses with side shield protection is recommended.
HAND PROTECTION ; The use of Nitrile rubber gloves is recommended.
CLOTHING ; The use of plastic apron, sleeves, overalls, and rubber boots are recommended.

FLAMMABILITY

Fire Hazards
Not combustible

SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT
**Storage Precautions**

Store in a cool, dry, well ventilated area, out of direct sunlight. Store in suitable, labelled containers. Keep containers tightly closed when not in use and when empty. Protect from damage. Limit quantity of material in storage. Restrict access to storage area. Post warning signs when appropriate. Keep storage area separate from populated work areas. Inspect periodically for deficiencies such as damage or leaks.

**Transport**

Not classified as a Dangerous Good, according to the Australian Code, for the Transport of Dangerous Goods by Road and Rail.

**Storage Reg. Handling**

This material is a SCHEDULED (S5) POISON and must be stored, handled and maintained according to the appropriate Commonwealth Regulations. Avoid generating dust and mist. Use dust-tight containers. Prevent accumulations of dust. Use smallest possible amounts in designated areas with adequate ventilation.

Have emergency equipment (for spills, leaks, etc.) readily available. Label containers. Keep containers closed when not in use. Empty containers may contain residues which are hazardous.

**Proper Shipping Name**

None Allocated

### SPILLS & DISPOSAL

**Spills & Disposal**

Increase ventilation. Evacuate all unnecessary personnel. Wear Self-Contained Breathing Apparatus (S.C.B.A.) and full protective clothing to minimise skin exposure. Dampen spilled material with water to avoid airborne dust, then transfer material to a suitable container. Use absorbent paper dampened with water to pick up remaining material. Wash surfaces well with soap and water. Seal all wastes in vapour tight plastic bags for eventual disposal. If large quantities of this material enter the waterways contact the Environmental Protection Authority, or your local Waste Management Authority.

**Disposal**

Disposal of this material should be undertaken by a registered chemical disposal company.

### FIRE/EXPLOSION HAZARD

**Fire Fighting Procedures**

Wear Self-Contained Breathing Apparatus (S.C.B.A.) and full protective clothing to minimise skin exposure.

**Extinguishing Media**

Use extinguishing media suitable for surrounding environment.

### FIRE/EXPLOSION HAZARD cont…

**Hazardous Reaction**

STABILITY Stable under normal conditions

INCOMPATIBILITY- MAT’LS TO AVOID ACETYLENE-copper salts may react to form explosive acetylides.

HYDROXYLAMINE – anhydrous copper sulfate can cause ignition upon contact with hydroxylamine due to the heat of coordination.

**Hazchem Code**

None Allocated

### OTHER INFORMATION

**Toxicology**

ANIMAL TOXICITY DATA LD50 (oral, rat) : 960 mg/kg (as CuSo4.5H20). A value of 300 mg/kg has also been reported, but could not be verified.
EYE IRRITATION (rabbit) : Copper sulphate can cause corneal opacity. Severity of reaction depends upon concentration and duration of exposure and condition of the corneal epithelium. Particles of copper sulphate can cause inflammation, tissue destruction and corneal opacity (clouding).

TERATOGENICITY AND EMBRYOTOXICITY (subcutaneous, hamster) : Copper ions are necessary for normal embryonic development. Injection of excess copper (40 to 70% more than endogenous) caused fetal resorption and malformations, at levels not toxic to the mother. There are no reports of reproductive problems from copper salts taken orally or by inhalation.

REPRODUCTIVE TOXICITY (rats and mice) : Intratesticular injection of copper sulphate caused reversible tissue damage. Daily subcutaneous injection of 0.5 mg/kg copper sulphate did not cause necrosis but did decrease the weight of testis in mice and impair ability to make sperm. (Subcutaneous LD50 for rats and mice are 43 and 18mg/kg respectively).

MUTAGENICITY : The evidence of the mutagenicity of copper sulphate is inconclusive. Copper sulphate at 1.5 mg/ml caused DNA crosslinking in cultured rat cells. This effect was observed for many other divalent metal ions. Copper salts may increase the susceptibility of cells to viral transformation.

Information on Ecological Effects
Harmful to aquatic life.

Risk Statement
R22 Harmful if swallowed
R36/37/38 Irritating to eyes, respiratory system and skin.

Safety Statement
S24/25 Avoid contact with skin and eyes.

Pkg.& Labelling
As required by the National Code of Practice for the Labelling of Workplace Substances
As required by the Standard for the Uniform Scheduling of Drugs and Poisons.

Hazard Category
Harmful, irritant

Technical Data
Other CAS No(s) 7758-99-8

Empirical Formula & Structural
MOLECULAR FORMULA Cu-04-S
STRUCTURAL FORMULA Cu.S04

Formula
CHEMICAL FAMILY Inorganic copper salt

CONTACT INFORMATION
Caroline Vale
Winemaking Supplies & Services Pty Ltd
Phone 1800 462 380
caroline@winerysupplies.com.au

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the product in terms of its safety requirements. The data does not signify any warranty with regard to the product’s properties. Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace. The use should also be considered in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact Winemaking Supplies & Services Pty Ltd.