

Safety Data Sheet **COPPER (II) SULFATE Pentahydrate**

SDS no. PPPUQ47T • Version 1.0 • Date of issue: 2024-03-04

SECTION 1: Identification

GHS Product identifier

Product name	COPPER (II) SULFATE Pentahydrate
Substance name	Copper(II) sulfate pentahydrate
EC no.	231-847-6
CAS no.	7758-99-8
Index no.	029-023-00-4

Other means of identification

COPPER (II) SULFATE Pentahydrate Fine Granular LR	CL068
COPPER (II) SULFATE Pentahydrate Fine Granular AR	CA068
COPPER (II) SULFATE Pentahydrate Fine Granular TG	CT068
COPPER (II) SULFATE Pentahydrate Fine Granular	CP068

Recommended use of the chemical and restrictions on use

Used in agriculture as a soil additive, pesticide, fungicide, bactericide, algicide and herbicide, Bordeaux mixture, feed and fertiliser additive, germicide, textile mordant, tanning leather, preserving hides, pigments, dyes, electric batteries, electroplated coatings, medicine, wood and pulp preservative, engraving, lithography, ore flotation, steel manufacture, synthetic rubber, asphalt treatment, petroleum refining, copper salts, pyrotechnic compositions, antirusting compositions for radiator and heating systems, water-resistant adhesives for wood, analytical reagent and laboratory reagent.

Supplier's details

Name	ChemSupply Australia Pty Ltd
Address	38-50 Bedford Street 5013 Gillman South Australia Australia
Telephone	08 8440 2000
email	www.chemsupply.com.au

Emergency phone number

CHEMCALL 1800 127 406 (Australia) / +64-4-917-9888 (International)

SECTION 2: Hazard identification

General hazard statement

Classified as dangerous goods according to the Australian Dangerous Goods Code (ADG).

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Classified as Hazardous according to the Globally Harmonised System of classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Dangerous goods of Class 9 (Miscellaneous Dangerous Goods) are incompatible in a placard load with any of the following: Class 1, Class 5, if the Class 9 dangerous goods are fire risk substances.

Classification of the substance or mixture

GHS classification in accordance with: UN GHS revision 7

- Hazardous to the aquatic environment, short-term (acute), Cat. 1
- Hazardous to the aquatic environment, long-term (chronic), Cat. 1
- Serious eye damage/eye irritation, Cat. 1
- Acute toxicity, oral, Cat. 4

GHS label elements, including precautionary statements

Pictograms



Signal word

Danger

Hazard statement(s)

H302	Harmful if swallowed
H318	Causes serious eye damage
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician if you feel unwell,
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor/physician
P391	Collect spillage.
P501	Dispose of contents/container to an approved waste disposal facility

SECTION 3: Composition/information on ingredients

Substances

Substance name: Copper(II) sulfate pentahydrate; EC no.: 231-847-6; CAS no.: 7758-99-8; Index no.: 029-023-00-4; Formula: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$; Molecular weight: 159.6

Other names / synonyms: Sulfuric acid copper(2++) salt (1:1); Copper sulfate; Copper(II) sulfate pentahydrate; Copper sulphate; Copper sulfate pentahydrate; copper sulphate pentahydrate; Sulfuric acid copper(2+) salt (1:1); Cupric sulfate anhydrous; Copper (II) Sulfate; Cupric sulfate

SCLs/M-factors/ATEs: M=10

Information on Composition: May contain traces of sulfuric acid as an impurity.

Components

Component	CAS no.	Concentration
Copper(II) sulfate pentahydrate (EC no.: 231-847-6; Index no.: 029-023-00-4)	7758-99-8	98 - 100 % (weight)

SECTION 4: First-aid measures

Description of necessary first-aid measures

General advice	First Aid Facilities: Maintain eyewash fountain and drench facilities in work area.
If inhaled	If inhaled, remove from contaminated area to fresh air immediately. Apply artificial respiration if not breathing. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
In case of skin contact	Immediately remove contaminated clothing and wash affected area with water for at least 15 minutes. Ensure contaminated clothing is washed before re-use. Seek medical advice /attention depending on the severity.
In case of eye contact	Immediately irrigate with copious quantity of water for at least 15 minutes. Eyelids to be held open. Seek immediate medical assistance.
If swallowed	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. Give water to drink. DO NOT INDUCE VOMITING. Seek medical advice if symptoms persist.

Most important symptoms/effects, acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Indication of immediate medical attention and special treatment needed, if necessary

For advice in an emergency, contact a Poisons Information Centre (Phone Australia 131 126) or a doctor at once.

SECTION 5: Fire-fighting measures

Suitable extinguishing media

Small fire: Use dry chemical, CO₂, water spray or foam.

Large fire: Use water spray, fog or foam.

Specific hazards arising from the chemical

Hazards from Combustion Products: Oxides of sulfur, oxides of copper and copper fume.

Runoff may pollute waterways.

Special protective actions for fire-fighters

Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA) operated in positive pressure mode. Fight fire from safe location.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Avoid inhalation, contact with skin, eyes and clothing. Evacuate the area of all non-essential personnel.

Wear protective clothing specified for normal operations (see Section 8)

Methods and materials for containment and cleaning up

Sweep up (avoid generating dust) and using clean non-sparking tools transfer to a clean, suitable, clearly labelled container for disposal in accordance with local regulations.

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Seek expert advice on handling and disposal.
Prevent from entering into drains, ditches or rivers.

SECTION 7: Handling and storage

Precautions for safe handling

Avoid ingestion and inhalation of dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Minimize dust generation and accumulation. Keep containers closed when not in use. Work in fumehood and use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Wear suitable protective clothing. Contaminated clothing should be removed and washed before re-use. Wash hands and face thoroughly after working with material. Keep container dry. Ensure a high level of personal hygiene is maintained when using this product. That is; always wash hands before eating, drinking, smoking or using the toilet.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry place. Keep containers closed at all times. Do not store in unsuitable, unlabelled or incorrectly labelled containers.

Air sensitive, hygroscopic.

Corrosiveness: Solutions are corrosive to steel.

SECTION 8: Exposure controls/personal protection

Control parameters

CAS: 7758-99-8 (EC: 231-847-6)

Copper(II) sulfate pentahydrate

NIOSH: 1 mg/m³ REL-TWA inhalation

Appropriate engineering controls

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336.

Skin protection

Hand protection should comply with AS 2161, Occupational protective gloves - Selection, use and maintenance.

Recommendation: Excellent: Nitrile, Neoprene, PVC. Poor: NR latex.

Body protection

Clean clothing or protective clothing should be worn, preferably with an apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.

Respiratory protection

Where ventilation is not adequate, respiratory protection may be required. Avoid breathing dust, vapours or mists. Respiratory protection should comply with AS 1716 - Respiratory Protective Devices and be selected in accordance with AS 1715 - Selection, Use and Maintenance of Respiratory Protective Devices. Filter capacity and respirator type depends on exposure levels. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

SECTION 9: Physical and chemical properties

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Basic physical and chemical properties

Physical state	Solid
Appearance	Blue granules; blue crystals; light blue powder.
Color	No data available.
Odor	Odourless.
Odor threshold	No data available.
Melting point/freezing point	Loses 2H ₂ O @ 30 °C; loses a further 2H ₂ O @ 110 °C; becomes anhydrous by 250 °C; decomposes @ 560 °C (anhydrous).
Boiling point or initial boiling point and boiling range	No data available.
Flammability	No data available.
Lower and upper explosion limit/flammability limit	No data available.
Flash point	No data available.
Explosive properties	No data available.
Auto-ignition temperature	No data available.
Decomposition temperature	No data available.
Oxidizing properties	No data available.
pH	3.7 - 4.5 at 50 g/l at 25 °C (77 °F)
Kinematic viscosity	No data available.
Solubility	Solubility in Water: Very soluble (317 g/L @ 20 °C). Solubility in Organic Solvents: Soluble in ethanol, methanol and glycerol. Practically insoluble in most organic solvents.
Partition coefficient n-octanol/water (log value)	No data available.
Vapor pressure	No data available.
Evaporation rate	No data available.
Density and/or relative density	Specific Gravity: 2.28
Relative vapor density	No data available.
Particle characteristics	No data available.

Supplemental information regarding physical hazard classes

No data available.

Further safety characteristics (supplemental)

Other Information: Dielectricity constant: 6.60 (20 °C)

Taste: Nauseous; metallic taste

SECTION 10: Stability and reactivity

Reactivity

Stable under normal conditions of storage and handling.

Chemical stability

Stable. Slowly efflorescent in air.

Possibility of hazardous reactions

Copper salts may react with acetylene to form explosive acetylides.

Hazardous Polymerization: Will not occur.

Conditions to avoid

Exposure to moisture.

Avoid storing in direct sunlight and avoid extremes of temperature.

Incompatible materials

Acetylene gas; finely powdered metals, eg. magnesium metal; sodium hypobromite solutions; plain steel; galvanised pipes; strong reducing agents; hydroxylamine; strong oxidising agents.

Powdered metals, Anhydrous copper(II) sulfate, reacts violently with:, hydroxylamine, Magnesium

Hazardous decomposition products

No data available.

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity

Acute Toxicity - Oral: LD50 (rat): 482 mg/kg (OECD Test Guideline 401)

Ingestion: Harmful by ingestion. May cause burning pain in the mouth, throat, oesophagus and stomach, diarrhea, nausea, abdominal pain and ulceration of the gastrointestinal tract. If vomiting does not occur immediately, systemic copper poisoning may occur. Symptoms may include repeated vomiting, nausea, diarrhea, salivation, headache, cold sweat, weak pulse and metallic taste. Prolonged exposure to this material may lead to corrosion and necrosis of the gastrointestinal tract, with possible perforation (may occur due to copper sulfate). Copper poisoning leads to capillary damage, kidney and liver damage, central nervous excitation followed by depression, jaundice, convulsions, blood effects (i.e. bleeding of the GI tract), paralysis and coma. Death may occur from shock or renal failure.

Inhalation: Irritating to the respiratory tract. Symptoms may include coughing, wheezing, sore throat and shortness of breath. May result in ulceration and perforation of respiratory tract. Ulceration of the nasal septum is possible, due to trace sulfuric acid impurities. When heated, this compound may give off copper fume, which can cause symptoms similar to the common cold, including chills and stuffiness of the head.

Skin corrosion/irritation

Acute Toxicity - Dermal: LD50 (rat): >2000 mg/kg.

Irritating to skin. May cause redness and itching.

Serious eye damage/irritation

Causes serious eye damage, irritation, local inflammation, conjunctivitis, ulceration, clouding of the cornea, tissue destruction, corneal opacity and adhesion of the eyelid to the eye. Traces of sulfuric acid impurity may contribute to these effects.

Respiratory or skin sensitization

No data available.

Germ cell mutagenicity

No data available.

Carcinogenicity

No data available.

Reproductive toxicity

No data available.

Summary of evaluation of the CMR properties

No data available.

Specific target organ toxicity (STOT) - single exposure

No data available.

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Specific target organ toxicity (STOT) - repeated exposure

No data available.

Aspiration hazard

No data available.

Additional information

Chronic Effects: Chronic ingestion may cause liver, brain, muscle and kidney dysfunction. Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated exposure to dusts of copper salts may cause discoloration of the skin or hair, blood and liver damage, ulceration and perforation of the nasal septum, runny nose, metallic taste, and atrophic changes and irritation of the mucous membranes.

child TDLo oral 150mg/kg (150mg/kg) KIDNEY, URETER, AND BLADDER: "CHANGES IN TUBULES (INCLUDING ACUTE RENAL FAILURE, ACUTE TUBULAR NECROSIS)"

BLOOD: OTHER HEMOLYSIS WITH OR WITHOUT ANEMIA American Journal of Diseases of Children. Vol. 131, Pg. 149, 1977.

[Link to PubMed](#)

frog LDLo intravenous 25mg/kg (25mg/kg) "Handbook of Toxicology," 4 vols., Philadelphia, W.B. Saunders Co., 1956-59 Vol. 1, Pg. 76, 1955.

guinea pig LDLo intravenous 2mg/kg (2mg/kg) Environmental Quality and Safety, Supplement. Vol. 1, Pg. 1, 1975.

[Link to PubMed](#)

human LDLo oral 50mg/kg (50mg/kg) BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY)

BLOOD: HEMORRHAGE

KIDNEY, URETER, AND BLADDER: "CHANGES IN TUBULES (INCLUDING ACUTE RENAL FAILURE, ACUTE TUBULAR NECROSIS)" JAMA, Journal of the American Medical Association. Vol. 235, Pg. 801, 1976.

human TDLo oral 11mg/kg (11mg/kg) GASTROINTESTINAL: GASTRITIS

GASTROINTESTINAL: NAUSEA OR VOMITING

GASTROINTESTINAL: "HYPERMOTILITY, DIARRHEA" Lancet. Vol. 2, Pg. 700, 1960.

[Link to PubMed](#)

man LDLo oral 857mg/kg (857mg/kg) GASTROINTESTINAL: NAUSEA OR VOMITING Archiv fuer Toxikologie. Vol. 17, Pg. 20, 1958.

mouse LD50 intraperitoneal 7182ug/kg (7.182mg/kg) Comptes Rendus Hebdomadaires des Seances, Academie des Sciences. Vol. 256, Pg. 1043, 1963.

[Link to PubMed](#)

mouse LD50 intravenous 23300ug/kg (23.3mg/kg) BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY)

BEHAVIORAL: CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD Indian Journal of Pharmacology. Vol. 23, Pg. 153, 1991.

mouse LD50 oral 369mg/kg (369mg/kg) BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY)

BEHAVIORAL: CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD Indian Journal of Pharmacology. Vol. 23, Pg. 153, 1991.

mouse LDLo subcutaneous 500ug/kg (0.5mg/kg) Tokyo Joshi Ika Daigaku Zasshi. Journal of Tokyo Women's Medical College. Vol. 48, Pg. 313, 1978.

rabbit LD50 intravenous 10mg/kg (10mg/kg) BEHAVIORAL: CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD

GASTROINTESTINAL: "HYPERMOTILITY, DIARRHEA"

BEHAVIORAL: FOOD INTAKE (ANIMAL) Journal of Industrial Hygiene and Toxicology. Vol. 31, Pg. 301, 1949.

rat LD50 intraperitoneal 20mg/kg (20mg/kg) BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY)

BEHAVIORAL: CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD Indian Journal of Pharmacology. Vol. 23, Pg. 153, 1991.

rat LD50 intravenous 48900ug/kg (48.9mg/kg) BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY)

BEHAVIORAL: CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD Indian Journal of Pharmacology. Vol. 23, Pg. 153, 1991.

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rat LD50 oral 300mg/kg (300mg/kg) "Antifungal Compounds," Siegel, M.R., and H.D. Sisler, eds., 2 vols., New York, Marcel Dekker 1977Vol. 1, Pg. 507, 1977.

rat LD50 subcutaneous 43mg/kg (43mg/kg) Proceedings of the European Society of Toxicology. Vol. 16, Pg. 252, 1975.

rat LD50 unreported 520mg/kg (520mg/kg) Gigiena Truda i Professional'nye Zabelevaniya. Labor Hygiene and Occupational Diseases. Vol. 26(6), Pg. 21, 1982.

women LDLo oral 47320uL/kg (47.32mL/kg) GASTROINTESTINAL: "HYPERMOTILITY, DIARRHEA"

LIVER: "HEPATITIS (HEPATOCELLULAR NECROSIS), DIFFUSE"

KIDNEY, URETER, AND BLADDER: "CHANGES IN TUBULES (INCLUDING ACUTE RENAL FAILURE, ACUTE TUBULAR NECROSIS)" Nephron. Vol. 15, Pg. 74, 1975.

[Link to PubMed](#)

women TDLo oral 2100ug/kg/5W- (2.1mg/kg) GASTROINTESTINAL: "HYPERMOTILITY, DIARRHEA"

GASTROINTESTINAL: NAUSEA OR VOMITING

GASTROINTESTINAL: OTHER CHANGES Toxicologist. Vol. 54, Pg. 73, 2000.

SECTION 12: Ecological information

Toxicity

Severe marine pollutant - IMDG Code. Very toxic to aquatic life.

Short Summary of Assessment of Environmental Impact: When released into the soil, this material is not expected to biodegrade and may leach into ground water. When released into the water, this material is not expected to biodegrade or evaporate significantly. This material is expected to bioaccumulate significantly.

[8Y] Acute Toxicity - Daphnia: EC50 (Daphnia magna): 0.02 mg/l/48h.

SECTION 13: Disposal considerations

Disposal methods

Product disposal

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers.

Other disposal recommendations

Do not discharge this material into waterways, drains and sewers.

SECTION 14: Transport information

ADG (Road and Rail)

UN Number: 3077

Class: 9

Packing Group: III

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper sulphate pentahydrate)

Hazchem emergency action code (EAC)

2X

IMDG

UN Number: 3077

Class: 9

Packing Group: III

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Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(Copper sulphate pentahydrate)

EMS-No: F-A, S-F

Marine pollutant:yes

IATA

UN Number: 3077

Class: 9

Packing Group: III

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(Copper sulphate pentahydrate)

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

Australia SUSMP

Poison Schedule: S6

SECTION 16: Other information

Further information/disclaimer

ChemSupply Australia Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon ChemSupply Australia Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of ChemSupply Australia Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

Preparation information

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Standard for the Uniform Scheduling of Medicines and Poisons, Commonwealth of Australia

National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.'

Safe Work Australia, 'National Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals', July 2020.

Safe Work Australia, 'National Guide for Classifying Hazardous Chemicals', July 2020.

Safe Work Australia, Workplace Exposure Standards for Airborne Contaminants, December 2019

Safe Work Australia, Hazardous Chemical Information System (HCIS), hcis.safeworkaustralia.gov.au

IATA, Dangerous Goods Regulations (DGR)

IMO, International Maritime Dangerous Goods Code (IMDG)