



SAFETY DATA SHEET COPPER SULPHATE PENTAHYDRATE

SECTION 1: Identification: Product identifier and chemical identity

Product identifier

Product name	COPPER SULPHATE PENTAHYDRATE
Product No.	C26
CAS number	7758-99-8

Relevant identified uses of the substance or mixture and uses advised against

Application	Absorbents. Adhesives. Catalysts. Ceramics. Coatings, Inks. Cosmetics. Electroplating and Galvanic (including use in electronics, printed wiring boards, engraving/litho graphy, metal surface treatment, wire coating). Fertilisers. Glass. Laboratory chemicals. Leather dyes. Lubricants and Greases. Mineral flotation. Non-metal surface treatment. Photochemicals. Pigments. Polishes and waxes. Processing aids. Putties, fillers, construction chemicals. Raw material for non-ferrous smelting. Raw material for production of other compounds and fine chemicals. Rubber and plastics. Textile dyes. Washing and cleaning products (including solvent based products). Water Treatment Some grades of this substance are available for feed/food use. Feed additive. (3b405)
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Details of the supplier of the safety data sheet

Supplier	Norkem Limited Australia G19, Wheelers Hill Business Centre, 202 Jells Road, Wheelers Hill, Vic 3150, Australia T: +61 (0) 3 9560 0158 F: +61 (0) 3 9561 3935 datasheet@norkem.com
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Emergency telephone number

Emergency telephone	Australian Contact Number: +61 (0) 2801 44558 / 18000 74234 (toll-free) New Zealand Contact Number: +64 (0) 9929 1483 / 0800 446 881 (toll-free) National Poison Information Number: 131126
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SECTION 2: Hazard(s) identification

Classification of the substance or mixture

Physical hazards	Not Classified
Health hazards	Acute Tox. 4 - H302 Eye Dam. 1 - H318
Environmental hazards	Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410
Environmental	Acute M-factor = 10 . Chronic M-factor = 1.

Label elements

COPPER SULPHATE PENTAHYDRATE

Hazard pictograms



Signal word

DANGER

Hazard statements

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

Precautionary statements

P273 Avoid release to the environment.
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
 P301+P312 IF SWALLOWED: Call a POISON CENTER or 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 or doctor/ physician.
 P391 Collect spillage.

Notes

Classification and labelling:

Other hazards

This substance is not classified as PBT (persistent, bioaccumulative and toxic) or vPvB (very persistent and very bioaccumulative).

SECTION 3: Composition and information on ingredients

Substances

Product name	COPPER SULPHATE PENTAHYDRATE
CAS number	7758-99-8
Composition comments	Purity >90 <100% w/w

SECTION 4: First aid measures

Description of first aid measures

General information	Remove affected person from source of contamination. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing.
Inhalation	Move affected person to fresh air at once. Get medical attention. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get medical attention if any discomfort continues.
Ingestion	Never give anything by mouth to an unconscious person. Do not induce vomiting. Remove affected person from source of contamination. Give a few small glasses of water or milk to drink. Get medical attention immediately.
Skin Contact	Remove contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention promptly if symptoms occur after washing.
Eye contact	Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

Most important symptoms and effects, both acute and delayed

Inhalation	Coughing. Sore throat.
Ingestion	Stomach pain. Burning sensation in mouth. Diarrhoea. Nausea, vomiting. Shock.

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Skin contact	Redness. Pain.
Eye contact	Causes serious eye damage. Redness. Pain. Visual disturbances, including blurred vision.
<u>Indication of any immediate medical attention and special treatment needed</u>	
Notes for the doctor	Treat symptomatically.

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing media The product is non-combustible. Use fire-extinguishing media suitable for the surrounding fire.

Special hazards arising from the substance or mixture

Hazardous combustion products Thermal decomposition or combustion products may include the following substances: Sulphurous gases (SO_x). Oxides of the following substances: Copper.

Advice for firefighters

Protective actions during firefighting Control run-off water by containing and keeping it out of sewers and watercourses.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing conforming to Australia/New Zealand Standards AS/NZS 4967 (for clothing) AS/NZS 1801 (for helmets), AS/NZS 4821 (for protective boots), AS/NZS 1801 (for protective gloves) will provide a basic level of protection for chemical incidents.

Hazchem Code 2Z

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid inhalation of dust. Avoid contact with skin and eyes. For personal protection, see Section 8.

For non-emergency personnel Keep unnecessary and unprotected personnel away from the spillage.

Environmental precautions

Environmental precautions Do not discharge into drains or watercourses or onto the ground. Avoid the spillage or runoff entering drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

Methods and material for containment and cleaning up

Methods for cleaning up Collect powder using special dust vacuum cleaner with particle filter or carefully sweep into suitable waste disposal containers and seal securely. Label the containers containing waste and contaminated materials and remove from the area as soon as possible.

Reference to other sections

Reference to other sections For personal protection, see Section 8. For waste disposal, see Section 13.

SECTION 7: Handling and storage, including how the chemical may be safely used

Precautions for safe handling

Usage precautions Avoid spilling. Avoid inhalation of dust and contact with skin and eyes. Avoid handling which leads to dust formation. Mechanical ventilation or local exhaust ventilation may be required. For further information, see attached Exposure Scenario.

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Advice on general occupational hygiene

Good personal hygiene procedures should be implemented. Do not eat, drink or smoke when using this product. Wash at the end of each work shift and before eating, smoking and using the toilet. Take off contaminated clothing and wash it before reuse. Wash promptly with soap and water if skin becomes contaminated. Use appropriate skin cream to prevent drying of skin.

Conditions for safe storage, including any incompatibilities

Storage precautions

Store in tightly-closed, original container in a dry, cool and well-ventilated place. Store away from incompatible materials (see Section 10).

Specific end use(s)

Specific end use(s)

The identified uses for this product are detailed in Section 1. For further information, see attached Exposure Scenario.

SECTION 8: Exposure controls and personal protection

Exposure controls

Protective equipment



Appropriate engineering controls

Provide adequate general and local exhaust ventilation. Use mechanical ventilation if there is a risk of handling causing formation of airborne dust. For further information, see attached Exposure Scenario.

Eye/face protection

The following protection should be worn: Dust-resistant, chemical splash goggles. Personal protective equipment for eye and face protection should comply with Australia/New Zealand Standard AS/NZS 1337.

Hand protection

It is recommended that chemical-resistant, impervious gloves are worn. To protect hands from chemicals, gloves should comply with Australia/New Zealand Standard AS/NZS 2161. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. It is recommended that gloves are made of the following material: Rubber (natural, latex). Chloroprene rubber. Butyl rubber. Polyvinyl chloride (PVC). Thickness: 0.5mm Breakthrough time: > 480 minutes.

Other skin and body protection

Provide eyewash station and safety shower.

Respiratory protection

Respiratory protection may be required if excessive airborne contamination occurs. For further information, see attached Exposure Scenario. Large Spillages: Wear a full facepiece respirator fitted with the following cartridge: Particulate filter, type P3. Full face mask respirators with replaceable filter cartridges should comply with Australia/New Zealand Standard AS/NZS 1716.

Environmental exposure controls

The risk management measures that adequately control exposure of the environment are set out in the exposure scenarios in the annex to this Safety Data Sheet.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Crystalline powder.

Colour

Blue.

Odour

Odourless.

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Odour threshold	Not applicable.
pH	pH (diluted solution): 4.0 @ 1%
Melting point	Not applicable. Will decompose at temperatures exceeding 110°C.
Initial boiling point and range	Not applicable. Will decompose at temperatures exceeding 110°C.
Flash point	Not applicable. Substance is inorganic.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Scientifically unjustified.
Vapour pressure	Scientifically unjustified.
Relative density	2.286 g/cm ³
Solubility(ies)	Soluble in water. 22 g/100 g water @ 25°C
Partition coefficient	Scientifically unjustified. Substance is inorganic.
Auto-ignition temperature	Scientifically unjustified.
Decomposition Temperature	110°C
Viscosity	Not applicable.
Explosive properties	Scientifically unjustified. There are no chemical groups present in the product that are associated with explosive properties.
Oxidising properties	Scientifically unjustified. There are no chemical groups present in the product that are associated with oxidising properties.
Other information	Not available.

SECTION 10: Stability and reactivity

Reactivity	The following materials may react violently with the product: Strong alkalis. Magnesium. (Powdered metal.) Hydroxylamine. Reactions with the following materials may cause explosions: Acetylene. Potassium chlorate.
Stability	Stable at normal ambient temperatures.
Possibility of hazardous reactions	The material is acidic when dissolved in water and can react with magnesium to form hydrogen gas.
Conditions to avoid	Avoid heat.
Materials to avoid	Strong alkalis. Acetylene. Hydroxylamine. Magnesium. Potassium chlorate. Oxidising agents.
Hazardous decomposition products	Sulphurous gases (SO _x). Oxides of the following substances: Copper.

SECTION 11: Toxicological information

Information on toxicological effects

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Toxicological effects

Copper is an essential element and therefore, its concentration in the body is strictly and efficiently regulated by homeostatic mechanisms.

Inhalation: The “respirable” fraction is assumed to be 100% absorbed. Absorption of the “inhalable” fraction depends on particle size. The Multiple Path Model of Particle Deposition (MPPD) can quantify the particle dependent absorption.

Oral: An oral absorption of 25% has been adopted, based on studies in the rat.

Dermal: A dermal absorption of 0.3% has been adopted for soluble and insoluble copper substances in solution or suspension, based on in- vitro percutaneous tests with human skin. For dry exposure, a dermal absorption value of 0.03% applies.

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 480.0

Species Rat

Notes (oral LD₅₀) Harmful if swallowed. Test method: OECD 401.

ATE oral (mg/kg) 480.0

Acute toxicity - dermal

Notes (dermal LD₅₀) LD₅₀ > 2000 mg/kg, Dermal, Rat Test method: OECD 402. Based on available data the classification criteria are not met.

Acute toxicity - inhalation

Notes (inhalation LC₅₀) Not determined. Inhalation is not considered to be a likely route of exposure based on the physical properties of the substance. Based on available data the classification criteria are not met.

Skin corrosion/irritation

Animal data Dose: 0.5 g, 4 hr, Rabbit Erythema/eschar score: average < (1) Oedema score: No oedema (0). Test method: OECD 404. Based on available data the classification criteria are not met.

Serious eye damage/irritation

Serious eye damage/irritation Causes serious eye damage. Test method: OECD 405.

Skin sensitisation

Skin sensitisation Guinea pig maximization test (GPMT) - Guinea pig: Not sensitising. Test method: OECD 406. Based on available data the classification criteria are not met.

Germ cell mutagenicity

Genotoxicity - in vitro Bacterial reverse mutation test, Gene mutation: Negative. Test method: OECD 471. Based on available data the classification criteria are not met.

Genotoxicity - in vivo

DNA damage and/or repair: Negative. Test method: OECD 486. A mouse micronucleus test (EC method B.12) also gave negative results. Based on available data the classification criteria are not met.

Carcinogenicity

Carcinogenicity Based on a weight of evidence approach, it was concluded that copper compounds do not have carcinogenic potential. Test method: Journal of the American Pharmaceutical Association, 43(12): 722-737, Br. J. Cancer Sep; 23(3): 591-596, Fd Cosmet. Toxicol. 11: 827-840. Based on available data the classification criteria are not met.

Reproductive toxicity

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Reproductive toxicity - fertility Two-generation study - NOAEL > 1500 ppm, Oral, Rat Test method: OECD 416. Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

STOT - single exposure Not classified as a specific target organ toxicant after a single exposure.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure A 90-day oral repeat dose study conducted with copper sulphate pentahydrate in rats and mice (test method equivalent to EU B.26) gave the following results:

Forestomach lesions:

NOAEL in the rat: 16.7 mg Cu/kg bw/day

NOAEL in male mice 97 mg Cu/kg bw/day

NOAEL in female mice: 126 mg Cu/kg bw/day

Liver and kidney damage:

NOAEL in the rat: 16.7 mg Cu/kg bw/day

This study was used to calculate of an oral and systemic DNEL of 0.041 mg Cu/kg bw/day (including a Safety factor of 100 and an oral absorption of 25%). Based on available data the classification criteria are not met.

Aspiration hazard

Aspiration hazard Not relevant.

General information

:

Ingestion Harmful if swallowed.

Eye contact Causes serious eye damage.

SECTION 12: Ecological information

Toxicity Very toxic to aquatic life with long lasting effects.

Acute aquatic toxicity

LE(C)₅₀ 0.01 < L(E)C50 ≤ 0.1

M factor (Acute) 10

Acute toxicity ACUTE AQUATIC TOXICITY- test results and environmental classification:

Acute toxicity of copper ions was assessed using 451 L(E)C50 values from studies on soluble copper compounds. The lowest species-specific geometric mean reference value of 25.0 µg Cu/L was an L(E)C50 obtained for *Daphnia magna* at pH 5.5 - 6.5.

Copper sulphate pentahydrate is classified as very toxic to aquatic life.

Copper is an essential nutrient regulated by homeostatic mechanisms and does not bioaccumulate. Bio-available copper ions are rapidly removed from the water column.

Copper sulphate pentahydrate is classified as toxic to aquatic life with long lasting effects.

COPPER SULPHATE PENTAHYDRATE

Notes

At the Committee for Risk Assessment (RAC) meeting of 4th December 2014, it was decided that copper sulphate pentahydrate should be classified Aquatic, Acute 1 (M-factor 10). The RAC further considered that the concept of 'removal from the water column' cannot be incorporated into the environmental classification of copper and copper compounds until such time as it has been ratified by an international standardisation body such as the Organisation for Economic Cooperation and Development (OECD). It was therefore decided that all copper compounds should also be assigned Aquatic, Chronic 1. However, no chronic M-Factors have been assigned at this time, subject to further assessment of available data by the RAC.

Chronic aquatic toxicity

M factor (Chronic)

1

Chronic toxicity - Freshwater

CHRONIC FRESHWATER TOXICITY- test results and PNEC derivation:

Chronic toxicity of copper ions from soluble copper compounds was assessed using 139 NOEC/EC10 values from 27 species representing different trophic levels (fish, invertebrates and algae). Species-specific NOECs were normalised using Biotic Ligand Models and used to derive Species Sensitivity Distributions (SSD) and a lowest HC5 (the median fifth percentile of the SSD) of 7.8 µg dissolved Cu/L. This value is considered to be protective of 90% of EU surface waters and represents a reasonable worst case. Applying an assessment factor of 1, a default chronic freshwater PNEC of 7.8 µg dissolved Cu/L is assigned to assess local risks.

Chronic toxicity - Marine waters

TOSSICITA' CRONICA ACQUE MARINE risultati delle prove e derivazione PNEC:

La Tossicità cronica di ioni di rame da composti del rame solubili è stata valutata utilizzando valori 51 NOEC/EC10 da 24 specie che rappresentano livelli trofici diversi (pesci, invertebrati e alghe). Specie-specifico NOEC sono stati calcolati dopo la normalizzazione di carbonio organico disciolto (DOC) e sono stati utilizzati per ricavare i valori SSD e HC5. La Normalizzazione ad una DOC tipico per le acque costiere di 2 mg/ l determina un HC5 di 5,2 mg Cu / L disciolti. Applicando un fattore di valutazione pari a 1, un default cronico PNEC in acqua marina di 5.2 µg Cu/L disciolti viene stabilito per valutarne i rischi locali.

Chronic toxicity - Freshwater sediment

CHRONIC FRESHWATER SEDIMENT TOXICITY- test results and PNEC derivation:

Toxicity of copper ions from soluble copper compounds was assessed using 62 NOEC values from 6 benthic species. The NOECs were related to DOC and Acid Volatile Sulphide (AVS) and were used to derive SSDs and HC5 values. An HC5 of 1741 mg Cu/kg OC, corresponding to 87 mg Cu/kg dry weight, was calculated for a low AVS sediment with a default OC of 5%. Applying an assessment factor of 1, a default chronic freshwater sediment PNEC of 87 mg Cu/kg dry weight is assigned to assess local risks.

Chronic toxicity - Terrestrial

CHRONIC TERRESTRIAL TOXICITY- test results and PNEC derivation:

Toxicity of copper ions from soluble copper compounds was assessed using 252 NOEC/EC10 values from 28 different species representing different trophic levels (decomposers, primary producers, primary consumers). NOEC values were adjusted to account for differences between lab-spiked soils and field-contaminated soils by the addition of a leaching ageing factor of 2. The adjusted values were then normalized to a range of EU soils using regression bioavailability models and used to derive SSDs and a lowest HC5 value of 65.5 mg Cu/kg dry weight. Applying an assessment factor of 1, a default chronic soil PNEC of 65.5 mg Cu/kg dry weight is assigned.

Toxicity - Sewage Treatment Plant

TOXICITY TO SEWAGE TREATMENT PLANT (STP) MICRO-ORGANISMS

The toxicity of copper ions from soluble copper compounds was assessed using NOEC and EC50 values from high quality studies with STP bacteria and protozoa. The statistically-derived NOEC was 0.23 mg Cu/L in the STP. Applying an assessment factor of 1, a PNEC of 0.23 mg Cu/L is assigned for Sewage Treatment Plant.

COPPER SULPHATE PENTAHYDRATE

Persistence and degradability

Persistence and degradability The copper ions resulting from the degradation of this product cannot be degraded.

The fate of copper ions in the water column was modelled using the Ticket Unit World Model. Removal was also assessed using data from one mesocosm and three field studies. "Rapid" removal was demonstrated, defined as 70% removal within 28 days. Literature data confirm the strong binding of copper ions to sediment, with the formation of stable Cu-S complexes. Re-mobilisation of copper ions to the water column is therefore not expected. Copper does not meet the criteria as "persistent".

Bioaccumulative potential

Bioaccumulative Potential The "bioaccumulative" criteria are not applicable to essential metals.

Partition coefficient Scientifically unjustified. Substance is inorganic.

Mobility in soil

Mobility Copper-ions bind strongly to soil. The median water-soil partitioning coefficient (Kp) is 2120 L/kg.

Other adverse effects

Other adverse effects Copper sulphate pentahydrate does not contribute to ozone depletion, ozone formation, global warming or acidification.

SECTION 13: Disposal considerations

Waste treatment methods

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority. Residues and empty containers should be taken care of as hazardous waste according to local and national provisions.

SECTION 14: Transport information

UN number

UN No. (ADG)	3077
UN No. (IMDG)	3077
UN No. (ICAO)	3077

UN proper shipping name

UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper Sulphate) 9, III

Proper shipping name (ADG) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (COPPER SULPHATE PENTAHYDRATE)

Proper shipping name (IMDG) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (COPPER SULPHATE PENTAHYDRATE)

Proper shipping name (ICAO) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (COPPER SULPHATE PENTAHYDRATE)

Transport hazard class(es)

ADG class	9
ADG classification code	M7
ADG label	9
IMDG class	9

COPPER SULPHATE PENTAHYDRATE

ICAO class/division 9

Transport labels



Packing group

ADG packing group III

IMDG packing group III

ICAO packing group III

Environmental hazards

Environmentally hazardous substance/marine pollutant



Special precautions for user

EmS F-A, S-F

Hazchem Code 2Z

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

SECTION 15: Regulatory information

Inventories

EU - EINECS/ELINCS

Yes

Canada - DSL/NDSL

Yes

US - TSCA

Yes

Australia - AICS

Yes

Korea - KECI

Yes

China - IECSC

Yes

Philippines - PICCS

Yes

New Zealand - NZIOC

Yes

SECTION 16: Any other relevant information

COPPER SULPHATE PENTAHYDRATE

Abbreviations and acronyms used in the safety data sheet

ADG: Australian dangerous goods code
ATE: Acute toxicity estimate.
BCF: Bioconcentration factor.
CAS: Chemical abstracts service.

EC₅₀: 50% of maximal effective concentration.
IATA: International air transport association.
ICAO: Technical instructions for the safe transport of dangerous goods by air.
IMDG: International maritime dangerous goods.
LC₅₀: Lethal concentration to 50 % of a test population.
LD₅₀: Lethal dose to 50% of a test population (median lethal dose).
LOAEC: Lowest observed adverse effect concentration.
LOAEL: Lowest observed adverse effect level.
LOEC: Lowest observed effect concentration.
MARPOL 73/78: International convention for the prevention of pollution from ships, 1973 as modified by the protocol of 1978.
IBC: International code for the construction and equipment of ships carrying dangerous chemicals in bulk (International bulk chemical code).
NOAEC: No observed adverse effect concentration.
NOAEL: No observed adverse effect level.
NOEC: No observed effect concentration.
OECD: Organisation for Economic Co-operation and Development.
PBT: Persistent, bioaccumulative and toxic substance.

UN: United Nations.
vPvB: Very persistent and very bioaccumulative.

Key literature references and sources for data

Chemical safety report. International Chemical Safety Card, www.inchem.org. Institute for Occupational Safety and Health of the German Social Accident Insurance (AFI), GESTIS Substance database; www.dguv.de/ifa/gestis-database.

Revision comments

Revised classification. NOTE: Lines within the margin indicate significant changes from the previous revision.

Revision date

12/04/2019

Revision

7

Supersedes date

9/01/2019

SDS status

For further information, see attached Exposure Scenario.

Hazard statements in full

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.

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.