



# SAFETY DATA SHEET

## COPPER SULPHATE PENTAHYDRATE

### Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**CAS NUMBER:** 7758-99-8  
**PROPER SHIPPING NAME:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S  
 copper sulphate pentahydrate  
**UN NUMBER:** 3077

**PRODUCT USE:** Used as an agricultural fungicide, bactericide, algicide, herbicide; feed and fertiliser additive; in the manufacture of other copper salts; mordant in textile dyeing; tanning leather. Also used in preserving hides; in preparation of azo dyes; in preserving wood; in electroplating solutions; as battery electrolyte; in laundry and metal-marking inks; in petroleum refining; as floatation agent; in mordant baths for intensifying photographic negatives; in pyrotechnic compositions; in water-resistant adhesives for wood; in metal colouring and tinting baths; as reagent toner in photography and photoengraving.

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### Section 2 - HAZARDS IDENTIFICATION

#### STATEMENT OF HAZARDOUS NATURE

Hazardous Substance according to the criteria of the New Zealand Hazardous Substances and New Organisms legislation. Dangerous Good. EPA Approval number: HSR003126

#### HAZARD LABELLING WARNING



See Section 14 for UN labelling.

#### HAZARD CLASSIFICATION AND STATEMENTS

HSNO	GHS EQUIVALENT
6.1D (oral)	Acute toxicity: Oral - Category 4
6.3A	Skin irritation - Category 2
6.4A	Serious eye irritation - Category 2A

**24 HOUR EMERGENCY CONTACT TELEPHONE 0800 CHEMCALL 0800 243 622**

6.5B	Skin sensitization - Category 1
6.9B	Specific Target Organ Systemic Toxicity (Repeated exposure) - Category 2
9.1A	Aquatic toxicity (Acute) - Category 1
9.3C	Ecotoxic to terrestrial vertebrates

Harmful if swallowed.  
 Causes skin irritation.  
 Causes serious eye irritation.  
 May cause an allergic skin reaction.  
 May cause damage to organs (kidneys) through prolonged or repeated exposure.  
 Very toxic to aquatic life.  
 Harmful to terrestrial vertebrates.

## PRECAUTIONARY STATEMENTS

### PREVENTION

Keep out of reach of children.  
 Wash hands and exposed skin thoroughly after handling.  
 Do not eat, drink or smoke when using this product.  
 Wear protective gloves/protective clothing/eye protection/face protection.  
 Avoid breathing dusts or fumes.  
 Contaminated work clothing should not be allowed out of the workplace.  
 Avoid release into the environment.

### RESPONSE

Get medical advice/attention if you feel unwell.  
 For specific treatment see section 4 of this SDS.  
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 If eye irritation persists: Get medical advice/attention.  
 IF SWALLOWED: Rinse Mouth. Call a POISON CENTRE or doctor/physician if you feel unwell.  
 IF ON SKIN: Wash with plenty of soap and water.  
 If skin irritation or rash occurs: Get medical advice/attention.  
 Take off contaminated clothing and wash before re-use.  
 Collect spillage.

### DISPOSAL

Dispose of contents and packaging in accordance with relevant legislation.  
 See Section 13 of this SDS Document for more information.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%	HAZARDOUS
Copper sulphate pentahydrate	7758-99-8	100	Yes

**SYNONYMS:** Copper sulfate, pentahydrate; Copper (II) sulphate, pentahydrate; Sulfuric acid, copper(2+) salt (1:1), pentahydrate; cupric sulfate.

## Section 4 - FIRST AID MEASURES

### MAIN SYMPTOMS CAUSED BY EXPOSURE

Irritation of the skin, eyes, respiratory tract and gastrointestinal tract. Ingestion can cause metallic taste, breathing difficulty, sweating, headache and vomiting.

### SWALLOWED

Call the poison centre (0800 764766) or a doctor immediately for medical advice.  
 Rinse mouth with water.

**24 HOUR EMERGENCY CONTACT TELEPHONE 0800 CHEMCALL 0800 243 622**

Do not induce vomiting unless advised by the poison centre or doctor.

Do not give anything by mouth to an unconscious patient.

Place patient in the care of a medical officer or doctor. If one is not available, transport patient to a doctor or hospital along with a copy of the SDS.

#### **EYE**

Check if contact lenses are present, and if safe to do so remove them.

Immediately hold eyelids apart and flush the eye continuously with running water.

Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

Continue flushing until advised to stop by the Poison Centre or a doctor, or for at least 15 minutes.

Transport to hospital or doctor without delay even if no symptoms persist.

#### **SKIN**

Flush skin and hair with running water for several minutes while removing contaminated clothing, including footwear. Wash skin and hair thoroughly with soap and water.

If symptoms such as redness, itching or rash develop, seek medical attention.

#### **INHALED**

Remove patient from contaminated area to fresh air, keep warm and place at rest.

If symptoms such as shortness of breath, coughing, wheezing or burning in the mouth, throat or lungs develop call the poison centre/doctor. Be prepared to transport the patient to hospital.

#### **NOTES TO PHYSICIAN**

Treat symptomatically based on individual reactions of patient and judgement of doctor.

NOTE: In an emergency dial 111, for advice contact a Poison Centre (0800-764-766).

## **Section 5 - FIRE FIGHTING MEASURES**

#### **EXTINGUISHING MEDIA**

Use extinguishing media suitable for surrounding area; water spray, dry chemical, or carbon dioxide.

#### **FIRE FIGHTING**

Alert Fire Brigade and tell them location and nature of hazard.

Clear fire area of all non-emergency personnel. Stay upwind. Eliminate ignition sources.

Wear breathing apparatus plus protective gloves.

Prevent spillage from entering drains or water courses. If the product contacts water, it will dissolve.

Care should be taken to prevent this runoff from reaching drains and watercourses.

Use firefighting procedures suitable for surrounding area.

DO NOT approach containers suspected to be hot as they may rupture.

Cool fire exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

#### **FIRE/EXPLOSION HAZARD**

Not combustible/flammable.

Decomposition may release Sulphur oxides and metal oxides.

#### **FIRE INCOMPATIBILITY**

None known.

#### **HAZARDS FROM COMBUSTION PRODUCTS**

If heated above 600°C, SO<sub>2</sub> is released.

#### **PERSONAL PROTECTIVE EQUIPMENT**

Firefighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots and gloves). Limit exposure duration to 1 BA set 30 mins.

**HAZCHEM CODE**

2Z

**Section 6 - ACCIDENTAL RELEASE MEASURES**

Only fully trained personnel should be involved in handling chemicals.  
Personal Protective Equipment advice is contained in Section 8 of the SDS.

**MINOR SPILLS**

Environmental hazard - contain spillage.  
Clean up all spills immediately.  
Avoid contact with skin and eyes.  
Control personal contact by using protective equipment.  
Use dry clean up procedures and avoid generating dust.  
Place in a suitable labelled container for waste disposal.

**MAJOR SPILLS**

Personnel involved in the clean-up should wear full protective clothing including respiratory protection.  
Evacuate all unnecessary personnel.  
Increase ventilation. Avoid generating dust.  
Stop leak if safe to do so.  
If necessary, wet down with water and dike for later disposal.  
Do NOT let product reach drains or waterways. If product does enter a waterway advise emergency services or your local waste authority.  
Collect in a labelled chemical waste container and seal for disposal.  
Wash spill area with plenty of water after removal of contaminant.  
Decontamination run-off should be prevented from entering drains and watercourses.

**EMERGENCY RESPONSE PLANNING GUIDELINES (AIHA 2016)**

No ERPGs have been set for this substance by the American Industrial Hygiene Association.

**PROTECTIVE ACTION CRITERIA (PAC) - SCAPA, 2016**

Chemical (CAS Number)	PAC-1	PAC-2	PAC-3	Units
Copper (II) sulfate pentahydrate (7758-99-8)	12	32	190	mg/m <sup>3</sup>

PAC-1: Mild, transient health effects.

PAC-2: Irreversible or other serious health effects that could impair the ability to take protective action.

PAC-3: Life-threatening health effects.

**Section 7 - HANDLING AND STORAGE****PROCEDURE FOR HANDLING**

Operators should be trained in procedures for safe use of this material.  
Use good occupational work practice. When handling, DO NOT eat, drink or smoke.  
Avoid generating and breathing dust. Avoid contact with skin and eyes.  
Use personal protective equipment to control exposure.  
Avoid contact with incompatible materials.  
Avoid sources of heat.  
Avoid physical damage to containers. Keep containers securely sealed when not in use.  
Handle and open container with care. Use in a well-ventilated area.  
Always wash hands with soap and water after handling or if accidental exposure occurs. Work clothes should be laundered separately.  
Ensure an eye bath and safety shower are available and ready for use.  
Observe good personal hygiene practices.  
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

**SUITABLE PACKAGING**

Original packaging. Polyethylene or polypropylene container.

DO NOT use aluminium, steel or galvanised containers.

Check all containers are clearly labelled and free from leaks.

The UN Packaging specification number as well as the UN packaging Logo is to be printed on the bags.

**STORAGE INCOMPATIBILITY**

Avoid strong bases, galvanised metals, aluminium and nylon.

Avoid storage with powdered metals, magnesium, alkalis and hydroxylamine.

**STORAGE REQUIREMENTS**

Store in original packaging.

Keep containers securely sealed.

No smoking, naked lights or ignition sources.

Store in a cool, dry, well-ventilated area, out of direct sunlight.

Store away from incompatible materials and foodstuffs.

Protect containers against physical damage and check regularly for leaks.

## Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

**EXPOSURE CONTROLS**

Source	Material	Measurement	Limit
New Zealand WES 2019	Copper fume	time weighted average (TWA)	0.2 mg/m <sup>3</sup>
New Zealand WES 2019	Dusts and mists, as Cu	time weighted average (TWA)	1 mg/m <sup>3</sup>

**ENGINEERING CONTROLS****VENTILATION SYSTEM**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Refer to 'A simple guide to local exhaust ventilation' found on the WorkSafe New Zealand website.

**PERSONAL PROTECTION EQUIPMENT (PPE)****PERSONAL RESPIRATORS**

An approved dust mask e.g. a *P1* respirator, is recommended when using this product in dusty conditions. For more information see Australian/New Zealand Standard, AS/NZS 1715:2009 and AS/NZS 1716:2012. If in doubt, seek expert occupational hygiene advice.

**SKIN PROTECTION**

Wear impervious protective clothing, including boots, water resistant gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Refer to AS/NZS 2161.1:2016 Occupational Protective Gloves - Selection, use and maintenance. Dispose of contaminated gloves after use.

Ensure there is ready access to an emergency shower.

**EYE PROTECTION**

It is good practice to wear a minimum of safety glasses with side shields when working in industrial environments. Ensure that there is ready access to eye wash unit.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE**

Blue crystals or crystalline powder.

**PHYSICAL PROPERTIES**

Loses water of hydration by efflorescing slowly in air above 30°C, or rapidly on heating; loses two H<sub>2</sub>O above 30.6°C, two more at -114°C and the fifth H<sub>2</sub>O around 245°C.

PROPERTY	VALUE
State:	Solid
Odour:	Odourless
Molecular Weight:	249.68
Melting Range (°C):	110 (loses water)
Boiling Range (°C):	Not applicable
Solubility in water (g/L, 25°C):	~230
pH (5%/0.2M solution):	~4
Specific Gravity (water=1):	Not available
Relative Density (g/cm <sup>3</sup> ):	2.286
Volatile Component (%vol):	Not available
Relative Vapor Density (air=1):	Not available
Vapour Pressure (kPa):	Not available
Autoignition Temp (°C):	Not applicable
Flash Point (°C):	Not applicable
Lower Explosive Limit (%):	Not applicable
Upper Explosive Limit (%):	Not applicable
Decomposition Temp (°C):	110
Viscosity:	Not applicable
Evaporation Rate:	Not applicable

## Section 10 - CHEMICAL STABILITY AND REACTIVITY

**CHEMICAL STABILITY**

Product is stable under normal conditions of use, storage and temperature.

**CONDITIONS TO AVOID**

Avoid excessive heat, direct sunlight, static discharges, moisture, and temperature extremes. Keep containers dry and tightly closed to avoid moisture absorption and contamination.

**INCOMPATIBLE MATERIALS**

Incompatible with strong bases, oxidizing agents, powdered metals, magnesium, alkalis and hydroxylamine.

The solution reacts with magnesium to produce hydrogen (H<sub>2</sub>).

**HAZARDOUS DECOMPOSITION PRODUCTS**

Decomposition may produce toxic fumes of Sulfur oxides (SO<sub>x</sub>) and metal oxides.

**HAZARDOUS REACTIONS**

Metals and their oxides or salts may react violently with chlorine trifluoride. Chlorine trifluoride is a hypergolic oxidiser.

Copper dust or mist may react with acetylene to form shock-sensitive copper acetylides. Reacts violently with hydroxylamine.

Hazardous polymerization will not occur.

## Section 11 - TOXICOLOGICAL INFORMATION

**ACUTE HEALTH EFFECTS****SWALLOWED**

Ingestion can cause irritation of the gastrointestinal tract, including a burning sensation and abdominal pain. Nausea, dizziness, diarrhoea and vomiting may follow.

Animal experiments indicate that ingestion of less than 150 grams of copper sulphate pentahydrate may cause serious illness or fatality.

#### EYE

Causes pain, redness and blurred vision.

May cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals. Copper salts, in contact with the eye, may produce inflammation of the conjunctiva, ulceration and cloudiness of the cornea.

#### SKIN

Dermal contact can cause irritation, redness, pain, and rash in susceptible individuals.

#### INHALED

May cause cough and respiratory tract irritation. Pain, redness and difficulty breathing can result.

#### CHRONIC HEALTH EFFECTS

Repeated or prolonged oral exposure can cause effects on the blood, kidneys and liver. This may result in haemolytic anaemia, kidney impairment and liver impairment.

#### TOXICITY AND IRRITATION DATA

##### TOXICITY

Acute Oral Toxicity, Rat, LD<sub>50</sub>: >472.5 mg/kg [Manufacturer's SDS]

Acute Dermal Toxicity, Rabbit, LD<sub>50</sub>: >8000mg/kg [Manufacturer's SDS]

Acute Inhalation Toxicity, Rat, LC<sub>50</sub>: >2.95 mg/L [Manufacturer's SDS]

##### IRRITATION/ CORROSION

Skin: Irritating to the skin [NZ EPA CCID]

Eyes: Irritating to the eyes [NZ EPA CCID]

**Carcinogenic effects:** Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

**Mutagenic effects:** Not available.

**Reproductive or developmental effects:** Not available.

**Aspiration hazard:** Not classified.

**Specific target organ toxicity:** Known to cause damage to the kidneys after prolonged or repeated oral exposure. NOAEL of 1000ppm for males and 500ppm for females. [NTP, 1993]

**Sensitisation (respiratory/contact):** Contact sensitiser. Prolonged or repeated exposure to copper salts can cause irritation, producing itching and redness of the skin. Some may become sensitized to copper sulphate and develop allergic contact dermatitis. [NZ EPA CCID]

## Section 12 - ECOLOGICAL INFORMATION

#### ECOTOXICITY

Very toxic in the aquatic environment with long lasting effects, and harmful to terrestrial vertebrates.

#### ECOTOXICITY DATA

Fish, (*Oncorhynchus mykiss*), 96h LC<sub>50</sub>: 0.032 mg/L [NZ EPA CCID]

Crustacean, (*Daphnia magna*), 48h EC<sub>50</sub>: 0.18 mg/L [NZ EPA CCID]

Algae (*Selenastrum capricornutum*), 5-day EC<sub>50</sub>: 0.0031 mg/L [NZ EPA CCID]

Acute Oral Toxicity, Rat, LD<sub>50</sub>: >472.5 mg/kg [Manufacturer's SDS]

**Persistence and Degradability:** Persistent in the environment.

**Mobility:** Soluble in water.

**Bioaccumulation:** Not expected to bioaccumulate.

**BOD and COD:** No data available.

**Products of Biodegradation:** No data available.

DO NOT discharge into sewer or waterways.

## Section 13 - DISPOSAL CONSIDERATIONS

Disposal of Hazardous Substances is subject to the Resource Management Act and Council By-Laws in addition to HSNO requirements. Do not dispose with household rubbish.

### PRODUCT

Recycle wherever possible. Special hazard may exist - specialist advice may be required. The product may be treated so that it is no longer hazardous by a means other than dilution. This includes incineration at an approved site, burial in a landfill or treatment at a sewage facility. A class 9.1 substance that is or contains a component that is bioaccumulative and not rapidly degradable must be treated before discharge into the environment to reduce the percentage by volume of the substance in the discharge to 1% or any lesser percentage that may be set by the Authority after consideration of the ecotoxicity of the substance and the extent to which the substance is bioaccumulative. Consult a Waste Management Company or authorized landfill for disposal options.

### PACKAGING

Recycle wherever possible. Special hazard may exist - specialist advice may be required. Packaging should be rendered incapable of containing any material. Puncture containers to prevent re-use and bury at an authorised landfill. Empty containers may be decontaminated. The residual contents of the package must be diluted to below the thresholds for the respective hazard and the diluted residue is 1% or less of the volume of the package. Consult an approved Waste Management company for disposal options or dispose of at an approved waste disposal facility. Observe all label safeguards until containers are cleaned and destroyed. Where possible retain label warnings and SDS and observe all notices pertaining to the product.

## Section 14 - TRANSPORT INFORMATION



Labels Required: ENVIRONMENT, MISCELLANEOUS  
HAZCHEM: 2Z

#### UNDG:

UN Number	3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. copper sulphate pentahydrate
Dangerous Goods Class	9
Subrisk	n/a
Packing Group	III

#### Air Transport IATA:

UN/ID Number	3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. copper sulphate pentahydrate
ICAO/IATA Class	9
Subrisk	n/a
Packing Group	III
ERG Code	9L



**Maritime Transport IMDG:**

UN Number	3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. copper sulphate pentahydrate
IMDG Class	9
Subrisk	n/a
Packing Group	III
Marine Pollutant	Yes
EMS Number:	F-A, S-F

**Section 15 - REGULATORY INFORMATION****REGULATIONS**

Classified as hazardous according to the criteria of the New Zealand Hazardous Substances and New Organisms Act.

EPA Approval number: HSR003126

Certified handler, tracking and location compliance certification regulations do not apply.

For full HSNO controls and Health and Safety at Work regulations for this substance refer to the New Zealand EPA's Approved Hazardous Substances with Controls website.

Copper sulphate pentahydrate (CAS: 7758-99-8) is found on the following inventory lists:  
NZIoC, AICS, TSCA, EINECS, DSL

**Section 16 - OTHER INFORMATION**

NEW ZEALAND POISON CENTRE 0800 POISON (0800 764 766)  
NZ EMERGENCY SERVICES: 111

**Interpretation and Abbreviations**

ACGIH - American Conference of Governmental Industrial Hygienists.

ACVM - Agricultural Chemicals and Veterinary Medicines.

AICS - Australian Inventory of Chemical Substances.

AOX - Absorbable organic halogens.

APF - Assigned Protection Factor.

BOD - Biochemical Oxygen Demand.

China IECSC - Inventory of Existing Chemical Substances Produced or Imported in China.

COD - Chemical Oxygen Demand.

DSL - Canadian Domestic Substances List.

EINECS - European Inventory of Existing Commercial Chemical Substances.

ENCS - Japanese Existing and New Chemical substances.

IDLH - Immediately Dangerous to Life or Health Concentrations.

IARC - International Agency for Research on Cancer.

ISHL - Japanese Industrial Safety and Health Law List of Chemicals.

Koc - soil organic carbon-water partition coefficient

Kow - octanol/water partition coefficient

LOEL - Lowest Observed Effect Level.

LD<sub>10</sub> - Lethal Dose Low (the lowest dosage per unit of bodyweight of a substance known to have resulted in fatality in a particular animal species).

MAK - Maximum workplace concentration in the workplace air that generally does not have known adverse effects on the health of the employee nor cause unreasonable annoyance when a person is repeatedly exposed during long periods, usually 8 hours daily, 40hour working week).

NOAA - National Oceanic and Atmospheric Administration.

NOEC - No Observed Effect Concentration.

NTP - National Toxicology Program.

NZ EPA CCID - New Zealand Environmental Protection Authority Chemical Classification and Information Database.

NZIoC - New Zealand Inventory of Chemicals.

OECD HPV - The Organisation for Economic Co-operation and Development High Production Volume Chemicals.

PEL - Permissible exposure limit.

PPE - Personal Protective Equipment.

Prop 65 - California Proposition 65 List of Chemicals.

RTECS - Registry of Toxic Effects of Chemical substances.

SCAPA - Subcommittee on Consequence Assessment and Protective Actions.

STEL - Short term exposure limit.

TOC - Total Organic Carbon.

TSCA - US Toxic Substances Control Act Existing Chemicals.

TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

VOC - Volatile Organic Compounds.

**Sources of key data used to compile the datasheet:**

Manufacturer's SDS

NZ EPA CCID

CAMEO Chemicals

IPCS INCHEM

Pubchem

NTP Toxicity Report 29

National Oceanic and Atmospheric Administration Office of Response and Restoration Emergency Response Planning Guidelines (ERPGs)

**Date of first issue:** Prior to 2008

**Date of Preparation/Review:** 2020.01.10

**Amendments:** 5 yearly review of all sections. Update formatting.

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End of SDS