SAFETY DATA SHEET

COPPER SULPHATE (PENTAHYDRATE)

CAS No.: 7758-99-8

This Safety Data Sheet is issued by Suraj Chemicals as the distributor/supplier of record, based on manufacturer and published GHS / regulatory reference data for this substance. Users should also consult the specific manufacturer's SDS where available.

1. IDENTIFICATION

GHS Product identifier

COPPER SULPHATE, PENTAHYDRATE
Blue Vitriol; Blue Copperas; Cupric Sulphate Pentahydrate
CAS: 7758-99-8

Other means of identification

Not relevant

Recommended use of the chemical and restrictions on use

Relevant uses: agricultural fungicide/algaecide raw material, electroplating and battery manufacture, water treatment (algaecide), animal feed micronutrient, pigment and mordant in dyeing, chemical intermediate. For industrial/commercial user only.

Uses advised against: All uses not specified in this section or in section 7.3.

Supplier's details

SURAJ CHEMICALS
No 92, Govindappa Naicken Street, Shiva Complex, Chennai – 600001, Tamil Nadu, India
Tel: +91 - 7092722822, +91 - 9840284032 / +91 - 44 - 25393652, 42130281
Email: sales@surajchemicals.com | Website: www.surajchemicals.com
GST No: 33ACEPV8190L1ZZ

Emergency phone number

Emergency Contact No: +91 - 7092722822, +91 - 9840284032

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Acute Tox. 4	Acute oral toxicity, Category 4, H302
Eye Dam. 1	Serious eye damage, Category 1, H318
Aquatic Acute 1	Hazardous to the aquatic environment, acute hazard, Category 1, H400
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic hazard, Category 1, H410

GHS label elements, including precautionary statements

GHS: Danger

Hazard statements

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 statements

P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P273: Avoid release to the environment.
P280: Wear protective gloves/eye protection/face protection.
P301+P312: IF SWALLOWED: Call a POISON CENTER/doctor 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.
P391: Collect spillage.
P501: Dispose of the contents/containers to a licensed hazardous waste contractor.

Other hazards which do not result in classification

Not relevant

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Chemical description: Copper(II) Sulphate Pentahydrate

In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 7758-99-8	Copper(II) Sulphate Pentahydrate — Acute Tox. 4: H302; Eye Dam. 1: H318; Aquatic Acute 1: H400; Aquatic Chronic 1: H410 – Danger	≥98.5% (technical grade)

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

Mixtures

Non-applicable

4. FIRST AID MEASURES

Description of necessary first-aid measures

Request medical assistance immediately, showing the SDS of this product.

By inhalation

Remove the person affected from the area of exposure and provide fresh air. Seek medical attention if discomfort continues.

By skin contact

Wash affected skin thoroughly with plenty of water and soap.

By eye contact

Rinse eyes immediately and thoroughly with lukewarm water for at least 15 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Get immediate medical attention (H318).

By ingestion/aspiration

Rinse mouth with water. Do not induce vomiting. Get medical attention immediately if a significant quantity is swallowed (H302); copper salts can cause systemic effects.

Most important symptoms/effects, acute and delayed

Acute and delayed effects are indicated in sections 2 and 11.

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

Not relevant

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Suitable: Product is non-combustible; use extinguishing media appropriate to the surrounding fire (water spray, foam, dry chemical powder, carbon dioxide)
Unsuitable: None known

Specific hazards arising from the chemical

Non-flammable, non-combustible inorganic solid. On strong heating, releases water of crystallisation and sulphur oxide fumes.

Special protective actions for fire-fighters

Wear self-contained breathing apparatus where fume may be present. Cool fire-exposed containers with water spray; contain fire-fighting water run-off (Aquatic Acute 1/Chronic 1) and avoid uncontrolled discharge to watercourses.

Additional provisions

Use water spray to cool fire-exposed containers. Prevent fire-fighting water from entering drains or watercourses. Approach the fire from upwind where possible.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Isolate leaks provided there is no additional risk for the people performing this task. Personal protection equipment must be used against potential contact with the spilt product (see section 8). Evacuate the area and keep out those who do not have protection.

For emergency responders

Wear protective equipment (section 8). Keep unprotected persons away. Prevent spillage from reaching drains or watercourses using bunding/absorbent barriers.

Environmental precautions

Very toxic to aquatic life (H400/H410). Prevent product from entering drains, watercourses or soil under any circumstances. Notify the relevant authority immediately in case of environmental release.

Methods and materials for containment and cleaning up

Sweep or vacuum up dry material avoiding dust generation; collect in suitable, labelled containers. Contain and collect any liquid (dissolved) spillage; do not allow to reach water bodies.

Reference to other sections

See sections 8 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling

A. General precautions for safe use

Avoid generating and inhaling dust. Avoid contact with skin and eyes.

B. Technical recommendations for the prevention of fires and explosions

Non-flammable; no special fire/explosion precautions beyond routine housekeeping.

C. Technical recommendations on general occupational hygiene

Do not eat, drink or smoke while handling. Wash hands after use.

D. Technical recommendations to prevent environmental risks

Prevent any release to drains, watercourses or soil; bund bulk storage areas where practical (Aquatic Acute 1/Chronic 1).

Conditions for safe storage, including any incompatibilities

A. Specific storage requirements

Minimum Temp.	5°C
Maximum Temp.	30°C
Maximum time	24 Months

B. General conditions for storage

Store in a cool, dry, well-ventilated place in tightly closed containers, away from incompatible materials (section 10.5) and away from watercourses/drains. For additional information see subsection 10.5.

Specific end use(s)

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987):

Identification	Occupational Exposure Limit Type	Value
Copper (as Cu), dusts and mists CAS: 7758-99-8	Time Weighted average concentration (8 hrs)	1 mg/m³ (as Cu, general reference value)

Appropriate engineering controls

It is recommended to use localized extraction in the work area as a collective protection measure to avoid exceeding occupational exposure limits, in addition to individual protective equipment (PPE) as needed. Consult the manufacturer's information leaflet for storage, use, cleaning and maintenance of PPE.

B. Respiratory protection

Not normally required with adequate ventilation. Use a particulate filter respirator (FFP2/P2) where dust levels are elevated.

C. Specific protection for the hands

Chemical-resistant gloves (nitrile or PVC).

D. Eye and face protection

Chemical splash goggles or safety glasses with side shields (H318).

E. Bodily protection

Standard chemical-resistant work clothing.

F. Additional emergency measures

Emergency shower (ANSI Z358-1, ISO 3864-1:2011, ISO 3864-4:2011) and eyewash stations (DIN 12 899, ISO 3864-1:2011, ISO 3864-4:2011) should be available.

Environmental exposure controls

Avoid environmental spillage of both the product and its container. See subsection 7.1.D.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	
Physical state at 20°C	Solid (crystals)
Appearance	Crystalline solid
Color	Blue
Odor	Odourless
Odour threshold	Not relevant *
Volatility	
Boiling point at atmospheric pressure	Not applicable (loses water of crystallisation on heating; decomposes before boiling)
Vapour pressure at 20°C	Negligible
Evaporation rate at 20°C	Not relevant (solid)
Product Description	
Density / Relative density at 20°C	2.286 g/cm³ (literature)
Dynamic / Kinematic viscosity	Not applicable (solid)
Concentration	See section 3
pH	~3.5–4.5 (1% aqueous solution, mildly acidic; literature)
Vapour density at 20°C	Not relevant (solid)
Partition coefficient n-octanol/water 20°C	Not applicable (inorganic salt)
Solubility in water at 20°C	Soluble, ~320 g/L (literature)
Decomposition temperature	Loses water of crystallisation from ~110°C; decomposes to CuO at higher temperature (>650°C)
Melting point/freezing point	Loses water of crystallisation on heating (no simple melting point)
Flammability	
Flash Point	Non-applicable (non-combustible solid)
Flammability (solid, gas)	Non-flammable
Autoignition temperature	Non-applicable
Lower / Upper flammability limit	Non-applicable
Particle Characteristics	
Median equivalent diameter	Available on request (grade dependent)

** Not relevant due to the odourless, non-volatile nature of the solid at ambient temperature.*

Other information

Explosive properties	Not relevant (non-explosive)
Oxidising properties	Non-oxidising
Corrosive to metals	Corrosive to some metals (e.g., iron, aluminium, zinc) in aqueous solution via galvanic/redox action
Heat of combustion	Not relevant (non-combustible)
Surface tension at 20°C	Not relevant (solid)
Refraction index	Not relevant (solid)

10. STABILITY AND REACTIVITY

Reactivity

Stable under normal conditions of storage and use. Aqueous solutions are mildly acidic and reactive with reducing agents and certain metals (displacement reaction).

Chemical stability

Chemically stable under recommended storage conditions; loses water of crystallisation on heating.

Possibility of hazardous reactions

Reacts with strong reducing agents, magnesium, and metals such as zinc/aluminium/iron in solution (galvanic displacement of copper). Reacts with hydrazine and other reactive organics.

Conditions to avoid

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Not applicable	Loses water of crystallisation on heating	Stable	Deliquesces slowly; keep dry to prevent caking

Incompatible materials

Strong Reducing Agents	Reactive Metals (Al, Zn, Mg)	Hydrazine
Avoid contact	Avoid contact (galvanic reaction)	Avoid contact

Hazardous decomposition products

Sulphur oxide fumes and copper oxide on strong heating/decomposition.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:

A. Ingestion (acute effect)
Harmful if swallowed (H302); copper salts cause gastrointestinal irritation, nausea, vomiting and, in significant quantity, systemic copper toxicity (hepatic/renal effects).

B. Inhalation (acute effect)
Dust may cause irritation of the nose, throat and respiratory tract.

C. Contact with skin and eyes (acute effect)
May cause mild skin irritation; causes serious eye damage (H318).

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity)
Classification criteria for carcinogenicity, mutagenicity and reproductive toxicity are not met based on available data.

E. Sensitizing effects
Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure
Classification criteria are not met based on available data.

G. Specific target organ toxicity (STOT) – repeated exposure
Classification criteria are not met based on available data; repeated excessive exposure to copper compounds has been associated with liver effects in the literature.

H. Aspiration hazard
Not relevant (solid).

Product-specific toxicological information

Identification	Acute Toxicity	Genus
Copper Sulphate Pentahydrate CAS: 7758-99-8	LD50 oral: ~300–960 mg/kg (literature range)	Rat

12. ECOLOGICAL INFORMATION

Very toxic to aquatic life with long lasting effects (Aquatic Acute 1, Aquatic Chronic 1).

Toxicity

Identification	Acute Toxicity	Genus
Copper Sulphate Pentahydrate CAS: 7758-99-8	LC50 (96h): <1 mg/L (literature; copper is highly toxic to fish)	Fish
	EC50 (48h): <1 mg/L (literature)	Crustacean (Daphnia)

Persistence and degradability

Inorganic substance; not biodegradable. Copper is a naturally occurring element that partitions to sediment; persistence/degradability concepts as applied to organics are not directly applicable.

Bioaccumulative potential

Copper can bioaccumulate in some aquatic organisms, though it is also an essential trace nutrient regulated physiologically at low concentrations; excess exposure is toxic.

Mobility in soil

Koc	Henry	Dry Soil	Moist Soil
Moderate	Low	Mobile as soluble Cu2+ ion; binds to soil organic matter/clay	Mobile

Results of PBT and vPvB assessment

Non-applicable (inorganic substance; PBT criteria apply to organic substances).

Other adverse effects

Very toxic to algae, fish and aquatic invertebrates; used deliberately as an algaecide/fungicide at controlled low doses – uncontrolled release is environmentally damaging.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Do not discharge to drains, watercourses or soil under any circumstances. Collect spillage/waste and dispose of via a licensed hazardous waste contractor in accordance with local regulations. Where feasible, recover for reuse. Empty containers may retain hazardous residue.

Refer to national and local regulations on waste management (Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, as amended).

14. TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023)

14.1 UN number	UN3077 (bulk / when meeting Class 9 EHS criteria)
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper Sulphate)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Packages ≤5 kg may be exempt from full dangerous goods marking/documentation under ADR Special Provision 375; physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG 41-22)

14.1 UN number	UN3077 (bulk / when meeting Class 9 EHS criteria)
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper Sulphate)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Marine pollutant	Yes
14.6 Special precautions for user	EmS Codes: F-A, S-F | Small packaged quantities may be exempt under IMDG Special Provision 969/966
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO 2024)

14.1 UN number	UN3077 (bulk / when meeting Class 9 EHS criteria)
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper Sulphate)
14.3 Transport hazard class(es)	9
14.4 Packing group	III
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

15. REGULATORY INFORMATION

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

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

Other legislation

Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
Public Liability Insurance Act, 1991

16. OTHER INFORMATION

Legislation related to safety data sheets

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3

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.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources

United Nations GHS (Rev. 8); ECHA Classification & Labelling Inventory; publicly available peer-reviewed and regulatory toxicological/ecotoxicological literature for this CAS number.

Abbreviations and acronyms

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | COD: Chemical Oxygen Demand | BOD5: 5-day biochemical oxygen demand | BCF: Bioconcentration factor | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | Log-POW: Octanol-water partition coefficient | Koc: Partition coefficient of organic carbon | IARC: International Agency for Research on Cancer

Disclaimer: The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

(This document is computer generated and therefore does not require any signature.)