Product Name: COPPER SULFATE PENTAHYDRATE

1. IDENTIFICATION

1.1 PRODUCT IDENTIFIER: COPPER SULFATE PENTAHYDRATE

CAS: 7758-99-8
Product Name: COPPER (II) SULFATE PENTAHYDRATE
Chemical Formula: $CuSO_4.5H_20$
REACH Registration No: 01-2119520566-40
According to REACH Annex V, paragraph 6; the hydrates of a substance are covered by the registration of the anhydrous material.

SDS Number: CC0CUSOUS

1.2 CONTACT INFORMATION

Distributor: Cameron Chemicals, Inc.
830 Old Dill Road
Suffolk, VA 23434 USA

1.3 EMERGENGY PHONE NUMBERS

Telephone: *For Information*: (757) 934-2142 (7am-4pm)
For Emergency: CHEMTREC (1-800-424-9300)(24hrs)

1.4 RELEVANT USES

This product is used in agriculture, particularly as: fertilizer or the ingredient for the manufacture of bulk blend fertilizers. The product has many uses including: Insulation grade fiberglass, Laboratory chemicals, Manufacture of substances, Absorbents, Ceramics, Coatings, Inks, Cosmetics.

2. HAZARD IDENTIFICATION

2.1 CLASSIFICATION

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

2.2 LABEL

Hazard pictograms:

Signal word: **Warning**

Hazard statements:

- H302 Harmful if swallowed.
- H315 Causes skin irritation.
- H319 Causes serious eye irritation.
- H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements:

- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
- P302 + P352 IF ON SKIN: Wash with plenty of water.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P501 Dispose of contents/container in accordance with regional regulations

Supplementary Precautionary Statements:

- P270 Do not eat, drink or smoke when using this product.
- P264 Wash contaminated skin thoroughly after handling.
- P330 Rinse mouth.
- P332+313 If skin irritation occurs: Get medical advice/attention.
- P337+313 If eye irritation persists: Get medical advice/attention.
- P362 Take off contaminated clothing and wash before reuse.
- P391 Collect spillage.
- P321 Specific treatment (see medical advice on this label).

2.3 OTHER HAZARDS

No Information available

3. COMPOSITION OF PRODUCTS

Ingredient:	Copper (II) sulfate pentahydrate
Formula:	$CuSO_4.5H_20$
Molecular Weight:	249.69 g/mol
% (By Weight):	96-100%
CAS-No.:	7758-99-8
EC-No.:	231-847-6
Index-No.:	029-004-00-0
REACH Registration No:	01-2119520566-40

4. FIRST AID

4.1 GENERAL FIRST AID

Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

EYE CONTACT

Rinse immediately with plenty of water. Do not apply neutralizing agents. Take victim to an ophthalmologist if irritation persists. Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.

SKIN CONTACT

Wash immediately with lots of water. Do not apply (chemical) neutralizing agents. Take victim to a doctor if irritation persists. Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

INHALATION

Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service. Assure fresh air breathing. Allow the victim to rest.

INGESTION

Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Consult a doctor/medical service if you feel unwell.
Ingestion of large quantities: immediately to hospital. Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Immediately call a POISON CENTER or doctor/physician.

4.2 MAIN SYMPTOMS AND ACUTE AND DELAYED EFFECTS:

- Symptoms/injuries after inhalation: AFTER INHALATION OF DUST: Dry/sore throat. Coughing. ON HEATING: Metal fume fever.
- Symptoms/injuries after skin contact: Tingling/irritation of the skin.
- Symptoms/injuries after eye contact: Irritation of the eye tissue.
- Symptoms/injuries after ingestion: Metal taste. Irritation of the oral mucous membranes. Nausea. Vomiting. Headache. Dizziness. Feeling of weakness. AFTER ABSORPTION OF HIGH QUANTITIES: Abdominal pain. Diarrhea. Change in the blood count/blood composition. Change in urine composition. Disturbances of consciousness.
- Chronic symptoms: ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Red skin. Itching. Skin rash/inflammation. Feeling of weakness. Loss of weight. Coughing. Possible inflammation of the respiratory tract. Risk of pneumonia. Enlargement/affection of the liver.

4.3 MEDICAL ATTENTION INDICATION AND SPECIAL TREATMENT TO BE UNDERTAKEN IMMEDIATELY:

No additional information available

5. FIRE HAZARDS

5.1 EXTINGUISHING MEDIA
Use water spray, dry chemical or carbon dioxide suitable for surrounding area. CAUTION: slippery in liquid form.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE
Sulphur oxides, Copper oxides. The product itself doesn't burn, and is non-combustible.

5.3 ADVICE FOR FIREFIGHTERS
Wear self-contained breathing apparatus and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

6.1 PRECAUTIONS, PROTECTIVE EQUIPMENT
Avoid breathing dust. Ensure adequate ventilation. Wear personal respirator in compliance with product recommendations in the event of airborne dust formation.

6.2 ENVIRONMENTAL PRECAUTIONS
Do not flush down drains. Prevent leakage and spillage. If river/lake contamination, inform proper authorities.

6.3 CONTAINMENT AND CLEAN UP
Sweep up waste and place in container for disposal in accordance with applicable local, state, and federal laws. Uncontaminated spilled material may be reused. Avoid direct contamination of water bodies.

6.4 OTHER SECTION REFERENCE
See sections 8, 12 & 13

7. HANDLING AND STORAGE

7.1 HANDLING
Handling should maintain package integrity to minimize dust formation or accumulation. Avoid eye contact, prolonged skin contact and/or breathing dust. Handle in appropriately ventilated areas.

7.2 STORAGE
Do not contaminate water, food or feed by storage or disposal. Store in the original labeled container in a cool, dry place away from direct sunlight.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

8.1 EXPOSURE CONTROL PARAMETERS

Copper Dust:	PC-TWA 1mg/m^3	PC-STEL: 2.5mg/m^3
Copper Fume:	PC-TWA 0.2mg/m^3	PC-STEL: 0.6mg/m^3

DNEL - No data available.

PNEC

Fresh water:	0.0078 mg/l
Marine water:	0.0052 mg/l
Sewage treatment plant:	0.23 mg/l
Fresh water sediment:	87 mg/kg
Marine sediment:	676 mg/kg

8.2 ENGINEERING CONTROLS

Provide exhaust ventilation to maintain airborne dust concentrations of below exposure limits.

PERSONAL PROTECTION

8.2.1 Respiratory protection

Use dust masks or respirators approved by appropriate government standards where appropriate. If full-face respirators are required, use type N100 (U.S.) or type P3 (EN143) respirator cartridges.

8.2.2 Eye & Hand Protection

Hand protection: Wear protective gloves.

Glove material: Natural Latex Break through time: > 480 min

Glove thickness: 0.6 mm (Gloves must be inspected prior to use. Replace when worn.)

Supplementary note: Due to varying conditions (e.g. temperature or other strains) it must be considered that the usage of a chemical protective glove in practice may be much shorter than the permeation time determined in accordance with EN 374.

Eye protection: Safety goggles

Skin and body protection: Impervious clothing. Wear suitable protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Crystals
Odor:	Odorless
Color:	Blue
Molecular weight:	249.69 g/mol
Melting point/range:	110 °C
Boiling point/boiling range:	Not applicable
Flash point:	Not applicable
Flammability (solid, gas):	The product is not flammable.
Ignition temperature:	Not applicable
Auto-ignition temperature:	Not applicable
Oxidizing properties:	The substance or mixture is not classified as oxidizing.
Lower explosion limit:	Not applicable
Upper explosion limit:	Not applicable
Vapor pressure:	7.3 mmHg at 25 °C (77 °F)
Density:	2.28 g/cm^3 at 20 °C
Bulk density:	1.000 kg/m^3
pH:	3.5 – 4.5 at 20 °C
Water solubility:	209 g/l at 20 °C

10. STABILITY AND REACTIVITY

10.1 REACTIVITY
Reacts violently with: hydroxylamine, magnesium, hydrogen peroxide (H_2O_2), bromates, chlorates.

10.2 CHEMICAL STABILITY
Product is stable at room temperature.

10.3 HAZARDOUS DECOMPOSITION REACTIONS
No data availability

10.4 CONDITIONS TO AVOID
Avoid excessive heat and freezing temperatures. Avoid generating dust.

10.5 INCOMPATIBLE MATERIALS
Powdered metals, Anhydrous copper (II) sulfate, hydrazine, nitro methane.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS
In case of fire hazardous decomposition products may be produced such as:
Copper oxides
Sulfur oxide

11. TOXICOLOGICAL INFORMATION

Copper is an essential element.

11.1 ACUTE ORAL TOXICITY
LD50 Species:
Rat Value: 482 mg/kg
Method: OECD Test Guideline 401

11.2 ACUTE OCULAR TOXICITY
Severe eye irritation

11.3 ACUTE DERMAL TOXICITY
LD50 Species: Rat Value: > 2.000 mg/kg

11.4 CARCINOGENICITY
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen.

11.5 INHALATION TOXICITY
Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

11.6 SKIN CORROSION/SENSITIZATION
Irritating to skin.

11.7 MUTAGENICITY
DNA Inhibition
Human: Lymphocyte = 76umol/L
DNA Synthesis
Rat: Liver = 31 umol/L
Cytogenetic Analysis
Rat: Ascites tumor = 300 mg/kg
Micronucleus Test
Mouse: Intraperitoneal = 5 mg/kg

11.8 REPRODUCTIVE TOXICITY
None known

12. ECOLOGICAL INFORMATION

12.1 ECOTOXICITY
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Fish Toxicity
Rainbow Trout 96h LC50 = 0.3mg/L
Toxicity to aquatic plants: no data available

Invertebrate Toxicity
EC50 Species: Daphnia magna (Water flea)
Value: 0.2 mg/l
Exposure time: 48 h

12.2 PERSISTENCE AND DEGRADABILITY
Degradability: The copper ions resulting from the degradation of this product cannot be degraded. Re-mobilization of copper ions to the water column is therefore not expected. Copper does not meet the criteria as “persistent”.

12.3 BIOACCUMULATIVE POTENTIAL
Bio-accumulative potential: The “bio-accumulative” criteria are not applicable to essential metals.
Partition coefficient. Not Applicable - Inorganic chemical.

12.4 MOBILITY IN SOIL

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

12.5 OTHER ADVERSE EFFECTS

None known. Copper sulfate pentahydrate does not contribute to ozone depletion, ozone formation, global warming or acidification.

13. DISPOSAL CONSIDERATIONS

13.1 DISPOSAL

Not classified as hazardous waste. Dispose in accordance with applicable Federal, state and local law regulations.

14. TRANSPORTATION INFORMATION

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

UN-N° (DOT): 3077
DOT NA N°: UN3077

14.2. UN proper shipping name

- DOT Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
- Department of Transportation (DOT) Hazard Classes: 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140
- Hazard labels (DOT): 9 - Miscellaneous dangerous substances and articles

- Packing group (DOT): III - Minor Danger
- DOT Special Provisions (49 CFR 172.102) : 8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies.

146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination.

335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s,” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the

material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging.

A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg:
a. Metal: 11A, 11B, 11N, 21A, 21B and 21N
b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2
c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2
d. Fiberboard: 11G
e. Wooden: 11C, 11D and 11F (with inner liners)
f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner).

B54 - Open-top, sift-proof rail cars are also authorized. IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).
N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle.
T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2)

TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

- DOT Packaging Exceptions (49 CFR 173.xxx): 155
- DOT Packaging Non Bulk (49 CFR 173.xxx): 213
- DOT Packaging Bulk (49 CFR 173.xxx): 240
- Marine pollutant: P

14.3. Additional Information

Other information: No supplementary information available.
State during transport (ADR-RID): as solid.

1. Overland transport

Packing group (ADR): III
Class (ADR): 9 - Miscellaneous dangerous substances and articles
Hazard identification number (Kemler No.): 90
Classification code (ADR): M7
Danger labels (ADR): 9 - Miscellaneous dangerous substances and articles

Orange plates:

Tunnel restriction code: E

2. Transport by sea
   DOT Vessel Stowage Location: A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.
   EmS-No. (1): F-A
   EmS-No. (2): S-F
3. Air transport
   DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27): No limit
   DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75): No limit

15. REGULATORY INFORMATION

15.1 US Federal Regulations:

Copper (II) Sulfate, Pentahydrate (7758-99-8)

Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on SARA Section 313 (Specific toxic chemical listings)

RQ (Reportable quantity, section 304 of EPA's List of Lists) :	10 lb.

15.2 International Regulations

Canada

Copper (II) Sulfate, Pentahydrate (7758-99-8)
Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

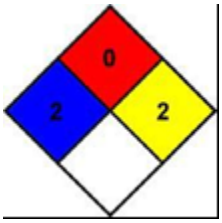
Acute Tox. 4 (Oral) H302
Eye Irrit. 2 H319
Skin Irrit. 2 H315
Aquatic Acute 1 H400
Aquatic Chronic 1 H410
Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC or 1999/45/EC

Xn; R22
Xi; R36/38
N; R50/53
Full text of R-phrases: see section 16

16. OTHER INFORMATION

NFPA health hazard: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
NFPA fire hazard: 0 - Materials that will not burn.
NFPA reactivity: 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



HMIS III Rating

Health: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability: 0 Minimal Hazard
Physical: 0 Minimal Hazard
Personal Protection: C

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Literature References:

1. ECOTOX: http://www.epa.gov/ecotox
2. TOXNET: http://www.toxnet.nlm.nih.gov