SAFETY DATA SHEET

Copper Sulfate

Section 01 - Product And Company Identification

Product Identifier ................. Copper Sulfate Pentahydrate

Product Use ............................. Industrial manufacturing, algicide, fungicide, herbicide, pesticide, animal feed additive.

Supplier Name ......................... ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK, Canada
S7K 1V7

Prepared By ............................. ClearTech Industries Inc. Technical Department
Phone: (800)387-7503

24-Hour Emergency Phone ........... 800-387-7503

Section 02 - Composition / Information on Ingredients

Hazardous Ingredients .................. Copper Sulfate Pentahydrate 100%

CAS Number .............................. Copper Sulfate Pentahydrate 7758-99-8

Synonym (s) ............................. Cupric sulfate, Bluestone, Blue Vitrol

Section 03 - Hazard Identification

Inhalation ................................. Inhalation may cause irritation of the respiratory tract. Excessive inhalation may also cause ulceration and nasal septum perforation.
Skin Contact / Absorption May cause severe skin irritation, itching of skin, and localized discoloration of the skin. Can cause allergic contact dermatitis.

Eye Contact May cause severe eye irritation. May result in irreversible eye damage.

Ingestion Ingestion may result in gastritis, nausea, vomiting, diarrhea and ulceration of the gastrointestinal tract. Severe poisoning or death may result from ingesting large doses.

Exposure Limits OSHA/PEL-TWA: 1.0mg/m$^3$ copper dust and mist. ACGIH/TLV-TWA: 1.0mg/m$^3$ copper dust and mist. NIOSH/IDHL-TWA: 1.0mg/m$^3$ copper dust and mist.

Section 04 - First Aid Measures

Inhalation Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek medical attention if difficulties persist.

Skin Contact / Absorption Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists. Wash contaminated clothing before reuse.

Eye Contact Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention if irritation persists.

Ingestion IF SWALLOWED: Call a POISON CENTER or doctor/physician immediately. Rinse mouth. Do NOT induce vomiting. Promptly drink large quantities of milk, egg white, gelatin solution, or if these are not available, drink large quantities of water. Never give anything by mouth to an unconscious person. Avoid alcohol.

Additional Information Note to Physicians: Treat symptomatically. Material may be corrosive. Possible mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be necessary. Wilson's disease can be aggravated by excessive exposure. Symptoms include nausea, vomiting, epigastric pain, diarrhea, jaundice, and general debility.

Section 05 - Fire Fighting Measures

Conditions of Flammability Non-flammable, does not burn
Means of Extinction

Product does not burn. Use appropriate extinguishing media (water spray, carbon dioxide, dry chemical, or foam) for material that is supplying the fuel to the fire. Do not release runoff from fire control methods to sewers or waterways.

Flash Point

Not applicable

Auto-ignition Temperature

Not applicable

Upper Flammable Limit

Not applicable

Lower Flammable Limit

Not applicable

Hazardous Combustible Products

If heated above 400°C/752°F product can decompose to emit toxic fumes of oxide and sulfur.

Special Fire Fighting Procedures

Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Explosion Hazards

Not available

---

Section 06 - Accidental Release Measures

Leak / Spill

Wear appropriate personal protective equipment if required. Stop or reduce leak if safe to do so. Vacuum or sweep up spilled material, making sure to avoid generation of dust. If material is diluted in water, prevent from entering sewers and carefully neutralize with lime or soda ash to form insoluble copper salts which should be disposed of by approved method to an approved waste disposal plant.

Deactivating Materials

Lime or soda ash

---

Section 07 - Handling and Storage

Handling Procedures

Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.

Storage Requirements

Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials. Storage materials compatible for copper sulfate include stainless steel [304, 304L or 316], rubber, fiberglass, polypropylene, PVC or other plastic material. Keep away from galvanized piping and nylon material. Place any damaged containers in plastic bags. Iron and moisture should be avoided. With exposure to air it will oxidize and turn whitish.
Section 08 - Personal Protection and Exposure Controls

Protective Equipment

Eyes. Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.

Respiratory. Respiratory protection is not normally required if handling crystal or granular material. If handling the powdered form of copper sulphate produces dust, then a NIOSH or MSHA approved air-purifying respirator is needed. For concentrations ten times greater than occupational exposure limits use a self contained breathing apparatus (SCBA).

Gloves. Impervious gloves of chemically resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Clothing. Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Footwear. Impervious boots of chemically resistant material should be worn.

Engineering Controls

Ventilation Requirements. Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other. Keep an eye wash fountain and safety shower available and in close proximity to work area.

Section 09 - Physical and Chemical Properties

Physical State. Solid

Odor and Appearance. Transparent blue crystals, granules or powder. Odorless.

Odor Threshold. Not determined

Specific Gravity (Water=1). 2.284
Vapor Pressure (mm Hg, 20°C) ……… Not applicable

Vapor Density (Air=1) ………………… Not applicable

Evaporation Rate …………………… Not applicable

Boiling Point ……………………... 150 °C / 302 °F

Freeze/Melting Point ………………... 110 °C / 230 °F

pH ………………………………………... Not applicable

Water/Oil Distribution Coefficient … Not available

Bulk Density ……………………… Not available

% Volatiles by Volume ………………… Not available

Solubility in Water …………………... 22.37% @ 0 °C / 32 °F

Molecular Formula …………………… CuSO4-5H2O

Molecular Weight ……………………. 249.68

---

**Section 10 - Stability and Reactivity**

**Stability** …………………………… Stable under recommended storage conditions.

**Incompatibility** ……………………… Hydroxylamine, magnesium, aluminum, ammonia, acetylene, sodium hypobromite and nitromethane can be corrosive to most ferrous based metals when moist. Contact with magnesium metal can generate dangerous levels of hydrogen gas. Aluminum will evolve less hydrogen gas upon contact. Copper dust or mist may react with acetylene gas to form shock sensitive copper acetylides. Contact with hydroxylamine will ignite hydroxylamine. Copper sulphate is very hygroscopic and will absorb moisture from the air to form a solution.

**Hazardous Products of Decomposition** … Under normal conditions of storage and use, hazardous decomposition products should not be produced. If dry heated above 600°C/1112°F toxic sulfur may evolve.

**Polymerization** ……………………… Will not occur.

---

**Section 11 - Toxicological Information**

**Irritancy** …………………………… Strong eye irritant. May cause skin irritation.
Sensitization
Repeted contact may cause sensitization in some individuals.

Chronic/Acute Effects
Severe exposure or chronic exposure by ingestion or inhalation of copper sulphate may induce severe gastroenteric distress (vomiting, gastroenteric pain, local corrosion, and hemorrhages), a metallic taste in the mouth, prostration, anuria, hematuria, anemia, an increase in white blood cells, coma, respiration difficulties, and circulatory problems. Prolonged skin contact may cause irritation and eczema. Chronic inhalation may result in anemia.

Synergistic Materials
Not available

Animal Toxicity Data
LD<sub>50</sub> (oral, rat): 300 mg/Kg
LD<sub>50</sub> (dermal, rat): > 2000mg/Kg
LD<sub>50</sub> (inhalation, rat): >2.95mg/L

Carcinogenicity
This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

Reproductive Toxicity
Not available

Teratogenicity
Not available

Mutagenicity
Not available

Section 12 - Ecological Information

Fish Toxicity
EC<sub>50</sub> (daphnia, 48 hour static): 0.147-0.227mg/L
LC<sub>50</sub> (lepomis macrochirus, 96 hour semi-static): 0.66-1.15mg/L
LC<sub>50</sub> (lepomis macrochirus, 96 hour static): 0.96-1.8mg/L
LC<sub>50</sub> (oncorhynchus mykiss, 96 hour static): 0.09-0.19mg/L
LC<sub>50</sub> (oncorhynchus mykiss, 96 hour flow-through): 0.1478-0.165mg/L
LC<sub>50</sub> (pimpephales promelas, 96 hour static): 0.6752mg/L

Biodegradability
Not available

Environmental Effects
Very toxic to aquatic life with long lasting effects. Do not apply directly to water except as directed under specific instructions. Prevent drift and run off from treated areas. In soil, copper can be particularly toxic to invertebrates and phytotoxic to plants at elevated concentrations with soil properties being regulating factors.

Section 13 - Disposal Consideration

Waste Disposal
Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Section 14 - Transport Information

TDG Classification

Shipping Name.................................. Copper Sulfate, Cupric Sulfate

Class........................................... 9

Group.......................................... III

PIN Number................................. UN 3077

Other............................................ Secure containers (full and/or empty) with suitable hold down devises during shipment and ensure all caps, valves, or closures are secured in the closed position.

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

WHMIS Classification.......................D1B, D2B

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

NSF Certification.......................... Product is certified under NSF/ANSI Standard 60 for use as an algicide at a maximum dosage for the following:

- Copper Sulfate Pentahydrate: 4mg/L
- Copper Sulfate Solution [25.2% copper sulfate]: 16mg/L

The finished drinking water shall be monitored to ensure that levels of copper do not exceed 1.3 mg/L.

Product does carry PMRA designation for use as an algicide.

Section 16 - Other Information

Version #...................................... Two

Preparation Date............................. February 11, 2013
Note: The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

Attention: Receiver of the chemical goods / SDS coordinator

As part of our commitment to the Canadian Association of Chemical Distributors (CADC) Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

---

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 800-387-7503
Fax: 888-281-8109
www.ClearTech.ca

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Postal Code</th>
<th>Phone Number</th>
<th>Fax Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richmond, B.C.</td>
<td>12431 Horseshoe Way</td>
<td>V7A 4X6</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>2023 Kingsway Avenue</td>
<td>V3C 1S9</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Calgary, AB.</td>
<td>5516E - 40th St, S.E.</td>
<td>T2C 2A1</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Edmonton, AB.</td>
<td>12020 - 142nd Street</td>
<td>T5L 2G8</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Saskatoon, SK.</td>
<td>North Corman Industrial Park</td>
<td>S7K 1V7</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Regina, SK.</td>
<td>555 Henderson Drive</td>
<td>S42 5X2</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Winnipeg, MB.</td>
<td>340 Saulteaux Crescent</td>
<td>R3J 3T2</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
<tr>
<td>Mississauga, ON.</td>
<td>7480 Bath Road</td>
<td>L4T 1L2</td>
<td>800-387-7503</td>
<td>888-281-8109</td>
</tr>
</tbody>
</table>

24 Hour Emergency Number - All Locations - 800-387-7503