Material Safety Data Sheet

Material Name: Copper Nitrate Solution

*** Section 1 - Chemical Product and Company Identification ***

Chemical Name: Copper Nitrate, Aqueous Solution

Product Use: Various Industrial Applications

Manufacturer Information
Mineral Research and Development, Inc.
5910 Pharr Mill Road
Harrisburg, NC 28075
Phone: 800-454-4811
Fax: 704-454-7390
Emergency #: CHEMTREC: (800) 424-9300

*** Section 2 - Composition / Information on Ingredients ***

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Component</th>
<th>Percent By Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>7732-18-5</td>
<td>Water</td>
<td>Balance</td>
</tr>
<tr>
<td>3251-23-8</td>
<td>Cupric nitrate (copper nitrate)</td>
<td>41-53</td>
</tr>
<tr>
<td>7697-37-2</td>
<td>Nitric acid</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Component Related Regulatory Information
This product may be regulated, have exposure limits or other information identified as the following: Copper (7440-50-8), Copper compounds, n.o.s., Copper (inorganic salts), Water Dissociable Nitrate Compounds.

Component Information/Information on Non-Hazardous Components
This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

*** Section 3 - Hazards Identification ***

Emergency Overview
This product is a medium to dark blue liquid with an acrid odor. In its dry form, Copper Nitrate (a component of this product) may act as an oxidizer to initiate and sustain the combustion of flammable materials; if this product is allowed to evaporate to dryness, the residue can present the hazards of an oxidizer. This product is an irritant and has a corrosive potential. Contact with mists, sprays or liquid product can severely irritate or burn eyes, skin, and other contaminated tissue. Eye contact may cause blindness. Severe inhalation and ingestion overexposures may be fatal.

Potential Health Effects: Eyes
Contact with the eyes will cause irritation, pain, reddening, and may result in blindness depending on the duration.

Potential Health Effects: Skin
This product is moderately irritating to the skin and other contaminated tissue. Depending on the duration of contact, symptoms will include reddening, discomfort, irritation, ulceration, and chemical burns. Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis. Skin absorption is not a significant route of overexposure.

Potential Health Effects: Ingestion
Ingestion of this product can be harmful or fatal. Immediately upon contact, this product will cause irritation and burns of the mouth, throat, esophagus, and other tissues of the digestive system. Overexposure symptoms include: drowsiness, confusion, difficulty swallowing, a burning sensation in the esophagus and stomach, intense thirst, nausea, abdominal pain, vomiting, diarrhea, stomach perforation, bloody stools or urine, convulsions, and collapse. Large quantity ingestion may be fatal.

Potential Health Effects: Inhalation
Inhalation of vapors, mists, or sprays of this product may irritate the nose, throat, and lungs. Symptoms may include: sneezing, coughing and difficulty breathing. Severe overexposures can result in pulmonary edema, pneumonitis, and death.
Material Safety Data Sheet

Material Name: Copper Nitrate Solution

HMIS Ratings: Health: 2 Fire: 0 Physical Hazard: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

*** Section 4 - First Aid Measures ***

First Aid: Eyes
In case of contact, immediately flush eyes with large amounts of water, continuing to flush for 15 minutes. Have contaminated individual "roll" their eyes. Seek immediate medical attention.

First Aid: Skin
Immediately take off all contaminated clothing. For skin contact, flush with large amounts of water. If irritation persists, get medical attention.

First Aid: Ingestion
Do not induce vomiting. Call a physician immediately.

First Aid: Inhalation
Move person to non-contaminated air. Call a physician if symptoms develop or persist.

First Aid: Notes to Physician
Provide general supportive measures and treat symptomatically.

*** Section 5 - Fire Fighting Measures ***

Flash Point: Not Flammable
Method Used: Not Applicable
Upper Flammable Limit (UFL): Not Applicable
Lower Flammable Limit (LFL): Not Applicable
Auto Ignition: Not Available
Flammability Classification: Not Applicable
Rate of Burning: Not Applicable

General Fire Hazards
This product is an aqueous mixture, which will not burn. If evaporated to dryness, the solid residue may pose a slight fire hazard. This product is an oxidizing agent, which may cause spontaneous ignition of combustible materials.

Hazardous Combustion Products
Decomposition of this product may produce acrid vapors, copper compounds, and oxides of nitrogen.

Extinguishing Media
Use any media suitable for the surrounding fires.

Fire Fighting Equipment/Instructions
Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. Fire fighters should avoid inhaling any combustion products.

NFPA Ratings: Health: 2 Fire: 0 Reactivity: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures
Stop the flow of material, if this is without risk. Wear appropriate protective equipment and clothing during clean up. Contain the discharged material and dike the spilled material where possible. Prevent entry into sewers, drains, underground or confined spaces, water intakes and waterways. Avoid contact with combustible materials.

Clean-Up Procedures
Absorb spill with inert material. Shovel material into appropriate container for disposal.

Evacuation Procedures
Isolate area. Keep unnecessary personnel away.

Special Procedures
Follow all Local, State, Federal and Provincial regulations for disposal.
*** Section 7 - Handling and Storage ***

Handling Procedures
Do not get this material in your eyes, on your skin, or on your clothing. Avoid breathing vapors or mists of this product. Wash thoroughly after handling. Do not eat, drink or use tobacco products when handling this material. Use this product with adequate ventilation. Launder work clothes frequently. See Section 8 for appropriate protective clothing, equipment and air monitoring procedures.

Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual liquid or vapors. Empty containers should be handled with care.

Storage Procedures
Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see SECTION 10: Stability and Reactivity). Material should be stored in secondary containers, or in a diked area, as appropriate. Keep container tightly closed when not in use. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

*** Section 8 - Exposure Controls / Personal Protection ***

A: Component Exposure Limits

Cupric nitrate (3251-23-8)
- ACGIH: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists, as Cu) (related to Copper)
- OSHA: 0.1 mg/m³ TWA (fume, dusts, mists as Cu) (related to Copper)
- Vacated: OSHA Final: 0.1 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists) (related to Copper)
- NIOSH: 1 mg/m³ TWA (dust and mist) (related to Copper)

Nitric acid (7697-37-2)
- ACGIH: 2 ppm TWA
  4 ppm STEL
- OSHA: 2 ppm TWA; 5 mg/m³ TWA
  4 ppm STEL; 10 mg/m³ STEL
- Vacated: OSHA Final: 2 ppm TWA; 5 mg/m³ TWA
- NIOSH: 2 ppm TWA; 5 mg/m³ TWA
  4 ppm STEL; 10 mg/m³ STEL

Engineering Controls
Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face
Wear safety glasses; chemical goggles (if splashing is possible).

Personal Protective Equipment: Skin
Use impervious gloves. Use of an impervious apron is recommended.

Personal Protective Equipment: Respiratory
Respiratory protection; not normally required for ambient air concentrations not exceeding the Occupational Exposure Limit. If ventilation is not sufficient to effectively prevent buildup of vapors or mists, appropriate approved NIOSH respiratory protection must be provided (i.e. air-purifying respirator with an acid-gas cartridge). Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2-1992). A written respiratory protection program, including provisions for medical certification, training, fit testing, exposure assessments, maintenance, inspection, cleaning, and convenient, sanitary storage must be implemented.
Personal Protective Equipment: General
Eyewash fountains and emergency showers are required.

*** Section 9 - Physical & Chemical Properties ***

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Medium to dark blue</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not Established</td>
</tr>
<tr>
<td>Solubility (H₂O)</td>
<td>Soluble</td>
</tr>
<tr>
<td>Odor</td>
<td>Acrid odor</td>
</tr>
<tr>
<td>pH</td>
<td>0-0.6</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not Established</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.44-1.65</td>
</tr>
</tbody>
</table>

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability
Stable under normal conditions.

Chemical Stability: Conditions to Avoid
Avoid exposure to extreme temperatures, contact with incompatible chemicals, and all contact with combustible materials.

Incompatibility
Strong bases, active metals (e.g., sodium, potassium), cyanide compounds, flammable and combustible materials, strong reducing agents, finely powdered metals.

Hazardous Decomposition
Copper compounds and nitrogen oxides.

Hazardous Polymerization
Will not occur.

*** Section 11 - Toxicological Information ***

Acute and Chronic Toxicity
A: General Product Information
This product is an irritant. Depending on the duration, contact can mildly to severely irritate the eyes, skin, mucous membranes, and any other exposed tissue. Inhalation may cause irritation of the respiratory system with coughing and difficulty breathing. Skin contact may cause blisters and scars. Eye contact may cause blindness. Severe inhalation and ingestion overexposures may be fatal.

B: Component Analysis - LD50/LC50
Cupric nitrate (3251-23-8)
Oral LD50 Rat: 794 mg/kg
100 mg/m³ IDLH (dust, fume and mist) (related to Copper)

Nitric acid (7697-37-2)
Inhalation LC50 Rat: 7 mg/L/4H
25 ppm IDLH

Carcinogenicity
A: General Product Information
No carcinogenicity data available for this product.

B: Component Carcinogenicity
None of this product’s components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.
Ecotoxicity

A: General Product Information
   In high concentrations, this product may be dangerous to aquatic life and fouling to shorelines.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity
   Cupric nitrate (3251-23-8)

<table>
<thead>
<tr>
<th>Test &amp; Species</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 Hr LC50 fathead minnow</td>
<td>23 µg/L related to Copper</td>
</tr>
<tr>
<td>96 Hr LC50 rainbow trout</td>
<td>13.8 µg/L related to Copper</td>
</tr>
<tr>
<td>96 Hr LC50 bluegill</td>
<td>236 µg/L related to Copper</td>
</tr>
<tr>
<td>72 Hr EC50 freshwater algae</td>
<td>120 µg/L related to Copper</td>
</tr>
<tr>
<td>(Scenedesmus subspicatus)</td>
<td></td>
</tr>
<tr>
<td>96 Hr LC50 water flea</td>
<td>10 µg/L related to Copper</td>
</tr>
<tr>
<td>96 Hr LC50 water flea</td>
<td>200 µg/L related to Copper</td>
</tr>
</tbody>
</table>

Environmental Fate
   Due to the low pH associated with this product, plants contaminated with this product may be adversely affected or destroyed. Animals contaminated with this solution may be severely injured or killed.

Disposal Considerations

US EPA Waste Number & Descriptions
A: General Product Information
   Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes. As packaged this product is a D002 corrosive waste [40 CFR 261.21(a)(4)]; applicable to wastes consisting only of this product.

B: Component Waste Numbers
   No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions
   Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

Transportation Information

US DOT Information
   Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s. (Copper Nitrate, Nitric acid )
   UN/NA #: UN3264  Hazard Class: 8  Packing Group: II
   Required Label(s): Corrosive

Canada Transportation of Dangerous Goods Information
   Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s. (Copper Nitrate, Nitric acid )
   UN/NA #: UN3264  Hazard Class: 8  Packing Group: II
   Required Label(s): Corrosive
**Section 15 - Regulatory Information**

**US Federal Regulations**

**A: General Product Information**

Components of this product have been checked against the non-confidential TSCA inventory by CAS Registry Number. Components not identified on this non-confidential inventory are exempt from listing (i.e. as polymers) or are listed on the confidential inventory as declared by the supplier.

**B: Component Analysis**

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

**Cupric nitrate (3251-23-8)**

- SARA 313: 1.0 % de minimis concentration (related to Copper)
- 1.0 % de minimis concentration (Chemical Category N511) (related to Water Dissociable Nitrate Compounds)
- CERCLA: 100 lb final RQ; 45.4 kg final RQ

**Nitric acid (7697-37-2)**

- SARA 302: 1000 lb TPQ
- SARA 313: 1.0 % de minimis concentration
- CERCLA: 1000 lb final RQ; 454 kg final RQ

**C: Federal Insecticide, Fungicide, and Rodenticide Act**

This material contains the following chemicals present on either the Listing of Pesticide Chemicals (40 CFR 180) or Pesticides Classified for Restricted Use as listed by FIFRA:

- **Cupric nitrate (3251-23-8)**
  - FIFRA Section number 180.538 (related to Copper)

**D: Component Marine Pollutants**

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>DOT regulated severe marine pollutant (related to Copper, metal powder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cupric nitrate</td>
<td>3251-23-8</td>
<td></td>
</tr>
</tbody>
</table>

**State Regulations**

**A: General Product Information**

Other state regulations may apply. Check individual state requirements.

**B: Component Analysis - State**

The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
<th>RI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cupric nitrate ('related to Copper)'</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes¹</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Component Analysis - WHMIS IDL**

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Minimum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cupric nitrate</td>
<td>3251-23-8</td>
<td>1 % (English Item 436, French Item 1203)</td>
</tr>
</tbody>
</table>

**Additional Regulatory Information**

**A: General Product Information**

No additional information available.
### B: Component Analysis - Inventory

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>AUST</th>
<th>MITI</th>
<th>PHIL</th>
<th>KOREA</th>
<th>ELINCS</th>
<th>CHINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Cupric nitrate</td>
<td>3251-23-8</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>7697-37-2</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### *** Section 16 - Other Information ***

**Other Information**

Disclaimer: Supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Material Safety Data Sheet before handling product.

**Key/Legend**


This is the end of MSDS # MRD-076