**MATERIAL SAFETY DATA SHEET**

**I PRODUCT IDENTIFICATION**

**MANUFACTURER'S NAME** Boliden Intertrade Inc.  
**ADDRESS** 3400 Peachtree Rd., NE, Suite 401, Atlanta, Georgia 30326 
**TRADE NAME** Copper Sulfate 
**SYNONYMS** Bluestone, Blue Vitriol 
**RECEIVED JUL 77 0002** 
**DOT** RQ, 10 lb/4.54 kg (Cupric sulfate) NA9188, ORM-D, 2.1, INC. 
**SHIPPING NAME** Hazardous substance, solid, n.o.s. 
**IATA** 

**II HAZARDOUS INGREDIENTS**

<table>
<thead>
<tr>
<th>MATERIAL OR COMPONENT</th>
<th>CAS NO.</th>
<th>%</th>
<th>HAZARD DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper sulfate pentahydrate</td>
<td>7758-98-7</td>
<td>99.0</td>
<td>Health hazard: Oral LD&lt;sub&gt;50&lt;/sub&gt; (rat, male) = 300 mg/kg.</td>
</tr>
<tr>
<td>(CuSO&lt;sub&gt;4&lt;/sub&gt;·5H&lt;sub&gt;2&lt;/sub&gt;O)</td>
<td></td>
<td></td>
<td>Product is toxic orally but not dermally. It is a skin sensitizing and skin irritant. It is corrosive to the eyes.</td>
</tr>
<tr>
<td>Copper 25.2% *</td>
<td></td>
<td></td>
<td>* Reportable under SARA Title III Sec. 313 and 40 CFR Part 372</td>
</tr>
</tbody>
</table>

Aquatic hazard: LC<sub>50</sub> set at &gt; 0.1 &lt; 1 mg/l by EPA water programs for hazardous substances.

**III PHYSICAL DATA**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling point, 760 mm Hg</td>
<td>5 H&lt;sub&gt;2&lt;/sub&gt;O @ 150° C.</td>
</tr>
<tr>
<td>Melting point</td>
<td>4 H&lt;sub&gt;2&lt;/sub&gt;O @ 110° C.</td>
</tr>
<tr>
<td>Specific gravity (H&lt;sub&gt;2&lt;/sub&gt;O = 1)</td>
<td>2.284</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>7.3 mg Hg @ 25° C.</td>
</tr>
<tr>
<td>Vapor density (Air = 1)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Solubility in H&lt;sub&gt;2&lt;/sub&gt;O % by wt</td>
<td>22.37 @ 0° C, 117.95 @ 100° C.</td>
</tr>
<tr>
<td>% Volatiles by vol</td>
<td>Not determined</td>
</tr>
<tr>
<td>Evaporation rate (Butyl Acetate = 1)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Appearance and odor</td>
<td>Blue crystals or powder. No odor.</td>
</tr>
<tr>
<td>Ph (as is)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ph (1% soln.)</td>
<td>5% soln. = pH 4.0</td>
</tr>
</tbody>
</table>

**IV FIRE AND EXPLOSION DATA**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point (test method)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammable limits in air, % by vol.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Extinguishing media</td>
<td>Copper sulfate does not burn, nor will it support combustion. If stored with other combustible products, use water, CO&lt;sub&gt;2&lt;/sub&gt; or dry chemical.</td>
</tr>
<tr>
<td>Special fire-fighting procedures</td>
<td>If dry heated above 600° C, SO&lt;sub&gt;2&lt;/sub&gt; is evolved. If water is used, it will solubilize the CuSO&lt;sub&gt;4&lt;/sub&gt;·5H&lt;sub&gt;2&lt;/sub&gt;O, and care should be used to keep such water out of streams or other water bodies.</td>
</tr>
<tr>
<td>Unusual fire and explosion hazard</td>
<td>None</td>
</tr>
</tbody>
</table>
### V HEALTH HAZARD INFORMATION

<table>
<thead>
<tr>
<th>HEALTH HAZARD DATA</th>
<th>HAZARD CLASSIFICATION</th>
<th>BASIS FOR CLASSIFICATION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Copper sulfate is a skin irritant and sensitizer including nasal membranes. Copper dusts and mists regulated. OSHA PEL = 1 mg (Cu)/M³. ACGIH TWA = 1 mg (Cu)/M³.</td>
<td>Acute inhalation LC₅₀: In excess of 1.48 mg/l air. OSHA 29 CFR 1910.1000 and American Conference of Governmental Industrial Hygienists (ACGIH) for 1987-1988.</td>
<td>Laboratory test in accordance with FHSLA regulations.</td>
</tr>
<tr>
<td>Skin Contact</td>
<td>Skin irritant and sensitizer especially to some individuals.</td>
<td>US EPA Pesticide fact sheet No. 87. Copper sulfate, PB87-116570, March 21, 1987.</td>
<td>Same as Basis for Classification</td>
</tr>
<tr>
<td>Skin Absorption</td>
<td>Not toxic dermally.</td>
<td>Dermal LD₅₀: In excess of 8,000 mg/kg.</td>
<td>Laboratory test in accordance with FHSLA regulations.</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>Corrosive</td>
<td>Eye irritation score: 24 hrs. = 41.67 48 hrs. = Corrosive</td>
<td>Laboratory test in accordance with FHSLA regulations.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Moderate toxicity in humans orally. High intraperitoneal toxicity.</td>
<td>Acute oral LD₅₀ (male rats) = 300 mg/kg</td>
<td>See Reference 1 below.</td>
</tr>
</tbody>
</table>

### EFFECTS OF OVEREXPOSURE

**Ingestion:** Copper sulfate may induce severe gastroenteric distress (vomiting, gastroenteric pain, and local corrosion and hemorrhages). Prostration, anuria, hematuria, anemia, increase in white blood cells, coma, respiratory difficulties and circulatory failure. **Eye:** Corrosive to eye tissue.

### ACUTE OVEREXPOSURE

Copper sulfate is reported to be systemic effect in humans (Ref. 1), which effects the metabolic and excretory function of the liver and kidney.

### EMERGENCY AND FIRST AID PROCEDURES

**EYES:** Irrigate eyes with large amounts of water for at least 15 minutes. Hold eyelids apart during irrigation. Send patient to a physician immediately.

**SKIN:** Wash or shower thoroughly with water. Remove and wash contaminated clothes before reuse.

**INHALATION:** Remove worker from exposure and seek medical aid.

**INGESTION:** If swallowed, call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger, or if available by administering syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person.

### NOTES TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

## VI REACTIVITY DATA

### CONDITIONS CONTRIBUTING TO INSTABILITY

None known. Product is highly soluble in water, but does not react with the water.

### INCOMPATIBILITY

None known when product remains dry. Product readily dissolves in water. Solutions are corrosive to mild steel. Store solutions in plastic, rubber, 304, 347, or 316 stainless steel.

### HAZARDOUS DECOMPOSITION PRODUCTS

None at normal process temperatures and pressures. If dry heated above 1100° F (600° C) sulfur dioxide (SO₂) may be released.

### CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

None known.

## VII DISPOSAL, SPILL OR LEAK PROCEDURES

### AQUATIC TOXICITY

LC₅₀ 24 hr = Daphnia magna = 0.182 mg/l. Rainbow trout = 0.17 mg/l. Bluegill = 1.5 mg/l. All values are expressed as copper sulfate pentahydrate. Test water was soft.

### WASTE DISPOSAL METHOD

Sweep up crystalline or powdered product and dispose in an approved landfill. If product is in confined solution, introduce lime or soda ash to form insoluble copper salts and then dispose in an approved landfill. Reportable Quantity of a spill is 10 lbs/4.54 kg. Product when discarded is not listed by EPA in 40 CFR § 261.33.

### STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

1. Contact appropriate, local, State, or Federal pollution control officials if warranted and especially if spilled into public waters.
2. If spill is confined to the worksite, neutralize with lime or soda ash and use absorbent and remove to approved landfill.

### NEUTRALIZING CHEMICALS

Soda ash or lime.

## VIII SPECIAL PROTECTION INFORMATION

### VENTILATION REQUIREMENTS

TWA = 1 mg (Cu)/m³ (ACGIH) and PEL = 1 mg (Cu)/m³ (OSHA) for all copper dusts and mists. If TWA or PEL exceeds this limit in workplace, appropriate ventilation should be provided, or respiratory protective equipment must be provided.

### SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

TWA = 1 mg (Cu)/m³ (ACGIH). PEL = 1 mg (Cu)/m³ (OSHA) for all copper dusts and mists. If TWA or PEL exceeds this limit in workplace, respiratory protective equipment must be provided in accordance with Paragraph 1910.134 of Title 29, Code of Federal Regulations.

### EYE

Chemical goggles should be worn when handling product.

### GLOVES

Rubber gloves may be worn.

### OTHER CLOTHING AND EQUIPMENT

Wear long sleeve protective clothing when handling product. Avoid breathing dust.
IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

No special precautions are known other than those stated on the bag and in this Material Safety Data Sheet. Under some use conditions copper sulfate dust may be irritating to the skin of some individuals. Problem use conditions seem to be aggravated by high humidity and sweating when copper sulfate is applied undiluted and dust contact occurs.

OTHER HANDLING AND STORAGE REQUIREMENTS

Store product in a dry place.

ADDITIONAL REGULATORY CONCERNS

FEDERAL:

FDA

Is Generally Recognized as Safe (GRAS) as a trace mineral for livestock when used in accord with good management practices. 21 CFR § 582.80.

USDA

Is GRAS when used in food wrap paper and paperboard products. 21 CFR § 182.90.

CPSC

TSCA

Is this product, or all its ingredients; being certified for inclusion on the Toxic Substances Control Act Inventory of Chemical Substances? Yes

Labeled and registered with EPA as a pesticide to control algae in water and roots in sewers or diseases on some plants. Follow specific label instructions.

OTHER

STATE:

OSHA: Product is a hazardous material as defined by 29 CFR § 1910.1200 because it is corrosive to the eye, it is toxic orally, and it is a regulated air contaminant for dusts and mists.

Product is not listed by the National Toxicology Program, the International Agency for Research on Cancer, nor the Registry of Toxic Effects of Chemical Substances (1983-84) as a carcinogen or potential carcinogen.

DOT: 49 CFR § 171 and 172. Copper sulfate is classified as a hazardous substance classed as ORM-E with a reportable quantity (RQ) as 10 lbs/4.54 kg.

SARA: This product is covered by SARA Title III with reporting requirements under 313.

PREPARED BY: Dr. Arthur F. Gohlke

TITLE: Technical Service Specialist

COMPANY: Boliden Intertrade Inc.

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ATLANTA, GEORGIA 30326

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