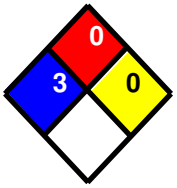
FREEPORT-McMoRan COPPER & GOLD

MATERIAL SAFETY DATA SHEET

Copper Sulfate Pentahydrate

Date Prepared: October 28, 2008



NFPA RATING

HEALTH	3	
FLAMMABILITY	0	
REACTIVITY	0	
PROTECTIVE EQUIPMENT		

HMIS RATING

SECTION I. PRODUCT IDENTIFICATION

Product Name: Copper Sulfate Pentahydrate

Synonyms: Triangle Brand Copper Sulfate Crystal

Product Use: Industrial manufacturing, animal feed, algaecide, fungicide, herbicide or pesticide.

Manufacturer/Vendor Information: Freeport-McMoRan Sierrita Inc.
P. O. Box 527
Green Valley, AZ 85622-0527

24-Hour Emergency Phone: (800)424-9300

Other Information: **Phone:** (520)648-8500
FAX: (520)648-8860

SECTION II. COMPOSITION / INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	Exposure Limits	% by wt.
7758-99-8	Copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$)	ACGIH TLV TWA: 1.0 mg/m^3 (as copper dust/mist) OSHA PEL TWA: 1.0 mg/m^3 (as copper dust/mist) NIOSH REL TWA 1.0 mg/m^3 (as copper dust/mist)	99

SECTION III. HAZARDS IDENTIFICATION

Emergency Overview: Odorless, transparent blue crystals, granules or powder. Can cause irreversible eye damage and slight skin irritation. Harmful if swallowed. Avoid breathing mist or dust and contact with skin, eyes or clothing.
Route(s) of Entry: Inhalation, absorption (through mucous membrane of the eye and intact skin), and ingestion.
Acute Exposure: Can cause skin, eye and respiratory irritation.
Chronic Exposure: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. In combination with Bordeaux mixture (vineyard spray), may result in liver disease. May aggravate individuals suffering from Wilson's disease.
Carcinogenicity (NTP) (IARC) (OSHA) (ACGIH): Not listed
Eye: Corrosive and may result in irreversible eye damage.
Skin Contact: Can cause skin irritation. May cause localized discoloration of the skin. Product specific tests in accordance with USEPA standards do not indicate skin sensitization.
Inhalation: Can result in irritation of the upper respiratory tract and in excessive quantities may cause ulceration and perforation of the nasal septum.
Ingestion: Can result in digestive tract irritation, nausea, vomiting, diarrhea and abdominal pain and death.
Medical Conditions Aggravated by Exposure to the Material: Wilson's Disease (an inherited disorder in which copper accumulates in the liver, leading to copper toxicosis); pre-existing dermatitis may be aggravated.

SECTION IV. FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water. Hold eye open and rinse slowly and gently for at least 15-20 minutes. Contact physician for treatment advice.
Skin: Wash skin with soap and plenty of water. If irritation persists contact a physician.

SECTION IV. FIRST AID MEASURES (Continued)

Ingestion: Contact a poison control center or physician for treatment advice immediately. This material may be fatal if ingested. Have person sip a glass of water if able to swallow. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless told to do so by the poison control center or physician.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

SECTION V. FIRE FIGHTING MEASURES

Flash Pt:	Not applicable
Flammable Limits in Air-Lower:	Not applicable
Flammable Limits in Air – Upper:	Not applicable
Auto Ignition Temperature:	Not applicable
Fire Fighting Extinguishing Media:	Does not burn or support combustion. Use extinguishing media appropriate for surrounding fire (CO_2, dry chemical or water).
Fire Fighting Equipment:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.
Fire Fighting Instructions:	Evacuate area and fight fire from a safe distance.
Fire and Explosion Hazards:	Sealed containers may rupture when heated due to release of water from crystals.
Explosion / Mechanical Impact / Static Discharge data:	Not available
Unusual Hazards:	Material is acidic when dissolved in water, contact with magnesium metal may evolve hydrogen gas. The product is corrosive to unprotected metal surfaces. Anhydrous cupric sulfate formed on water loss (white color). Anhydrous salt will ignite hydroxylamine, if present.

SECTION VI. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Use clean-up methods that avoid dust generation (vacuum, wet). Wear a NIOSH approved respirator if dust will be generated in clean-up. Use protective clothing if skin contact is likely. If material is diluted in a water solution, and a spill occurs in a confined area, introduce lime or soda ash to form insoluble copper salts and dispose of by approved method. Prevent accidental entry of solution into streams and other water bodies. Shovel any spills into plastic bags and seal with tape. Copper sulfate solution may deteriorate concrete.

SECTION VII. HANDLING AND STORAGE

Signal Word: Danger.

Handling Information: Avoid breathing dust or solution mist. Vacuum up crystals or powder. Eye wash stations should be available in work areas. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage Information: Store in closed containers in a cool, dry, well-ventilated area away from heat sources and reducing agents. Store copper sulfate in stainless steel, fiberglass, polypropylene, PVC's or plastic equipment. Keep away from galvanized pipe and nylon equipment. If container or bag is damaged, place the container or bag in a plastic bag. Use good housekeeping practices to prevent dust accumulation.

SECTION VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Use adequate general or local ventilation to keep airborne concentrations below the exposure limits.

Eye Protection: Use safety glasses with side-shields or goggles.

Skin Protection: Use protective clothing to prevent repeated or prolonged skin contact. Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, shoes plus socks, and protective eyewear. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with product's concentrate. Do not reuse them. Keep and wash PPE separately from other laundry.

Respiratory Protection: A respiratory protection program that meets OSHA 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant respirator use. For concentrations up to 10 times the exposure limit, use NIOSH approved half- or full-face, air-purifying respirator. For higher concentrations, consult a professional industrial hygienist.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Transparent blue crystals, granules or powder.
Melting Point:	Decomposition above 110 °C
Boiling Point:	150 °C @ 760 mmHg
Decomposition Temperature:	Not available
Density/Specific Gravity:	2.284 @ 15.6 °C
Odor/Odor Threshold:	Not available
Evaporation rate:	Not applicable
pH:	Not applicable
Coefficient of water/oil distribution:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Solubility in Water:	83.1 g/100 cc water @ 30 °C
Molecular Weight:	249.68
pH	Dissolved in water, the material is acidic

SECTION X. STABILITY AND REACTIVITY

Stability: Stable.
Incompatibility: Acetylene gas, aluminum powder, hydroxylamine, magnesium, moist air. Contact with magnesium metal can generate dangerous levels of hydrogen gas.
Conditions under which product is chemically unstable: Not applicable
Hazardous decomposition products: At temperatures >600 °C material decomposes to cupric oxide and sulfur dioxide.
Conditions of reactivity: Not applicable
Hazardous Polymerization: Will not occur.

SECTION XI. TOXICOLOGICAL INFORMATION

Toxicology Tests: (Triangle Brand Copper Sulfate Crystal)

Test : 1
LD/LC : LD_{50}
Test Type : Acute
Test Route : Dermal
Test Species : Rabbit
Results Amounts : >5050 mg/kg

Test : 2
LD/LC : LD_{50}
Test Type : Acute
Test Route : Oral
Test Species : Rat
Results Amounts : 352 mg/kg*
*Results based on toxicity evaluation of this product.

Test : 3
LD/LC : LC_{50}
Test Type : Acute, 4 hr
Test Route : Inhalation
Test Species : Rats
Results Amounts : >2.95 mg/L

Primary Eye Irritation: Corrosive, irreversible eye damage
Primary Skin Irritation: Slightly irritating.
Carcinogenicity: Not listed by NTP, IARC, OSHA, or ACGIH.
Mutagenicity: Not available.
Reproductive Toxicity: Not available.
Teratogenicity: Not available.
Toxicologically Synergistic Materials: Not available.
Additional Information: Inhalation of dust and mists of copper salts can result in irritation of nasal mucous membranes, sometimes of the pharynx and, on occasion ulceration with perforation of the nasal septum. Exposure to copper dust causes discoloration of the skin.
Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed. Wilson's disease (an inherited disorder in which copper accumulates in the liver) can be aggravated by excessive exposure. Symptoms may include nausea, vomiting, epigastric pain, diarrhea, dizziness, jaundice, and general debility.

SECTION XII. ECOLOGICAL INFORMATION

Subacute dietary LC_{50}: >10,000 ppm (quail and duck).
96 hr acute toxicity LC_{50}: 0.65 ppm (bluegill), 0.056 ppm (trout), 16 ppm (pink shrimp)
48 hr EC_{50}: 54 ppb (eastern oysters)
48 hr LC_{50}: 17 ppm (pink shrimp), 600 ppb (daphnia)
24 hr LC_{50}: 6.9 ppm (blue crab), 600 ppb (daphnia)
Bioaccumulation: Not available
Biodegradability: Not applicable

SECTION XIII. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Waste must be disposed of in accordance with federal, state/provincial and local environmental control regulations. Improper disposal is a violation of law. Do not reuse empty container. If allowed by federal, state/provincial and local authorities, dispose of container in a sanitary landfill or by incineration.

SECTION XIV. TRANSPORT INFORMATION

Proper Shipping Name:

DOT: UN 3077, Environmentally hazardous substances, solid, n.o.s., 9, PGIII, Marine Pollutant (Copper sulfate pentahydrate)

SECTION XV. REGULATORY INFORMATION

US Federal

Federal Drinking Water Standards: *(Copper)* EPA 1300µg/L (action level)
Clean Water Act: This product contains compounds identified in 40 CFR 116.4.
TSCA: Listed
EPCRA, SARA Title III, Section 313 (40 CFR 372) Chemicals subject to reporting requirements (see Section II for CAS number and percentage in mixture): Section 312 and/or 313 reporting may be required for this product, depending on the amount used and/or stored on site.
CERCLA Hazardous Substances: Not applicable
DOT: See Section XIV TRANSPORT INFORMATION

Canada

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all of the information required by the *Controlled Product Regulations.*

SECTION XVI. OTHER INFORMATION

Prepared By:	Freeport-McMoRan Sierrita Inc. Occupational Health and Safety
Reason for Revision:	October 2008: Amended to update transportation, environmental information and delete use of dated (obsolete) product synonyms.