MATERIAL SAFETY DATA SHEET

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Version 1.8

Section 1 - Product and Company Information

Product Name	COPPER(II) SULFATE PENTAHYDRATE, 98+%, A.C.S. REAGENT
Product Number	209198
Brand	SIAL
Company	World Precision Instruments, Inc.
Street Address	175 Sarasota Center Blvd.
City, State, Zip, Country	Sarasota FL 34240 US
Technical Phone:	941-371-1003
Emergency Phone:	941-371-1003
Fax:	941-377-5428

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
COPPER (II) SULFATE PENTAHYDRATE	7758-99-8	Yes

Formula: $CuSO_4 \cdot 5H_2O$

Synonyms: Blue copper AS * Copper(II) sulfate pentahydrate * Copper(2+) sulfate pentahydrate * Cupric sulfate pentahydrate * Kupfersulfat-pentahydrat (German) * Kupfervitriol (German) * Salzburg vitriol * Sulfuric acid, copper(2+) salt, pentahydrate * Sulfuric acid copper(2+) salt (1:1), pentahydrate (8CI,9CI) * Vencedor

RTECS Number: GL8900000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic (USA) Harmful (EU). Dangerous for the environment.
Harmful if swallowed. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Possible sensitizer. Target organ(s): Liver. Kidneys.

HMIS RATING
- HEALTH: 2*
- FLAMMABILITY: 0
- REACTIVITY: 1

NFPA RATING
- HEALTH: 2
- FLAMMABILITY: 0
- REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Handle and store under argon. Store in a cool dry place.

SPECIAL REQUIREMENTS
Air sensitive. Hygroscopic. Handle and store under inert gas.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Color: Blue Form: Crystals

Property	Value	At Temperature or Pressure
Molecular Weight	249.68 AMU	
pH	3.7 - 4.5	
BP/BP Range	N/A	
MP/MP Range	110 °C	
Freezing Point	N/A	
Vapor Pressure	7.3 mmHg	25 °C
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	2.284 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.
Conditions to Avoid: Air sensitive. Hygroscopic.
Materials to Avoid: Finely powdered metals Anhydrous copper(II) sulfate reacts violently with: hydroxylamine, magnesium.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Copper oxide, Sulfur oxides.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

SENSITIZATION
Skin: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

TARGET ORGAN(S) OR SYSTEM(S)
Blood. Liver. Kidneys.

SIGNS AND SYMPTOMS OF EXPOSURE
Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Human
1088 mg/kg
LDLO
Remarks: Behavioral:Coma. Liver:Jaundice (or hyperbilirubinemia) hepatocellular. Blood:Other hemolysis with or withot anemia.

Oral
Rat
300 mg/kg
LD50

Skin
Rat
> 2000 mg/kg
LD50

Intraperitoneal
Rat
18700 UG/KG
LD50

Intraperitoneal

Mouse
33 MG/KG
LD50

Intraperitoneal
Mammal
7500 UG/KG
LD50
Remarks: Gastrointestinal:Changes in structure or function of salivary glands. Behavioral:Somnolence (general depressed activity). Gastrointestinal:Nausea or vomiting.

CHRONIC EXPOSURE - TERATOGEN
Result: Possible risk of congenital malformation in the fetus.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 76 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Rat
Dose: 31 UMOL/L
Cell Type: liver
Mutation test: Unscheduled DNA synthesis

Species: Rat
Dose: 300 MG/KG
Cell Type: Ascites tumor
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 5 MG/KG
Mutation test: Micronucleus test

Species: Mouse
Route: Intraperitoneal
Dose: 1100 UG/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 5 MG/KG
Exposure Time: 5D
Mutation test: sperm

Species: Chicken
Route: Intraperitoneal
Dose: 7500 UG/KG
Mutation test: Micronucleus test

Species: Chicken
Route: Oral
Dose: 10 MG/KG
Mutation test: Micronucleus test

Species: Chicken
Route: Oral
Dose: 10 MG/KG
Mutation test: Cytogenetic analysis

Species: Chicken
Route: Intraperitoneal
Dose: 7500 UG/KG
Mutation test: Cytogenetic analysis

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD
Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Section 12 - Ecological Information

No data available.

ACUTE ECOTOXICITY TESTS
Test Type: LC50 Fish
Time: 96 h
Value: 1.0 - 2.5 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 0.024 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn-N
Indication of Danger: Harmful. Dangerous for the environment.
R: 22-36/38-50/53
Risk Statements: Harmful if swallowed. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 22-60-61
Safety Statements: Do not breathe dust. This material and its

container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic (USA) Harmful (EU). Dangerous for the environment.
Risk Statements: Harmful if swallowed. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Do not breathe dust. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Possible sensitizer. Target organ(s): Liver. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is subject to SARA section 313 reporting requirements - copper compounds.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.