SAFETY DATA SHEET

1. Material Identification

Product Name	: Copper sulfate pentahydrate
Catalog Number	r : io-39663
CAS Number	: 7758-99-8
Identified uses	: Laboratory chemicals, manufacture of chemical compounds
Company	: lonz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2) Acute toxicity, oral (Category 3) Acute toxicity, dermal (Category 3) Acute toxicity, inhalation (Category 3) Specific target organ toxicity, single exposure (Category 1)

Note

>> This chemical does not meet GHS hazard criteria for 80% (2009 of 2510) of all reports. Pictograms displayed are for 20% (501 of 2510) of reports that indicate hazard statements.

Pictogram(s)



>> Warning

GHS Hazard Statements

- >> H3O2 (18.4%): Harmful if swallowed [Warning Acute toxicity, oral]
- >> H315 (12%): Causes skin irritation [Warning Skin corrosion/irritation]
- >> H319 (11.9%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]
- >> H400 (17.6%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]
- >> H410 (16.9%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P264, P264+P265, P270, P273, P280, P301+P317, P302+P352, P305+P351+P338, P321, P330, P332+P317, P362+P364, P391, and P501

Health Hazards:

>> SYMPTOMS: Symptoms of exposure to this compound may include irritation of the skin, eyes, respiratory tract and gastrointestinal tract. Ingestion can cause severe gastroenteric distress (vomiting, pain, localized corrosion, and hemorrhages), prostration, anuria, hematuria, anemia, increased number of white blood cells, icterus, coma, respiratory difficulty and circulatory failure. It can also cause nausea, metallic taste, sweating, headache, burning sensation in the esophagus and stomach, abdominal pain, hemorrhagic gastritis, weak pulse, melena, conjunctivitis, corneal ulceration, hypotension and turbidity. Other symptoms may include watery and bloody stools, burning in the mouth and throat, liver damage with jaundice, hemolysis, tenesmus, retching, collapse and convulsions. Uremia, shock and renal failure

have been reported. Skin contact can cause smarting and first degree burns on short exposure. Prolonged exposure can result in second degree burns. Persons with preexisting Wilson's disease may be more susceptible to these effects.

- >> ACUTE/CHRONIC HAZARDS: This compound is toxic by ingestion. It is a strong irritant. When heated to decomposition it emits toxic fumes of sulfur oxides. It can be absorbed through the skin (repeated application to the skin causes poisoning). (NTP, 1992)
- >> Literature sources indicate that this compound is nonflammable. (NTP, 1992)
- >> Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. Many reactions may cause fire or explosion. See Chemical dangers

3. Composition/Information On Ingredients

Chemical name: Copper sulfate pentahydrateCAS Number: 7758-99-8Molecular Formula: CuH10O9SMolecular Weight: 249.6900 g/mol

4. First Aid Measures

First Aid:

- >> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.
- >> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.
- >> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.
- >> INGESTION: Some heavy metals are VERY TOXIC POISONS, especially if their salts are very soluble in water (e.g., lead, chromium, mercury, bismuth, osmium, and arsenic). IMMEDIATELY call a hospital or poison control center and locate activated charcoal, egg whites, or milk in case the medical advisor recommends administering one of them. Also locate lpecac syrup or a glass of salt water in case the medical advisor recommends inducing vomiting. Usually, this is NOT RECOMMENDED outside of a physician's care. If advice from a physician is not readily available and the victim is conscious and not convulsing, give the victim a glass of activated charcoal slurry in water or, if this is not available, a glass of milk, or beaten egg whites and IMMEDIATELY transport victim to a hospital. If the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest.

Eye First Aid

>> Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.

Ingestion First Aid

>> Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

5. Fire Fighting Measures

- >> Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. (NTP, 1992)
- >> In case of fire in the surroundings, use appropriate extinguishing media.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

- >> Excerpt from ERG Guide 151 [Substances Toxic (Non-Combustible)]:
- >> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- >> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.
- >> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance, protective gloves, protective clothing and safety goggles. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Well closed. Store only in original container. Store in an area without drain or sewer access.

Storage Conditions:

>> ... /Keep/ dry.

8. Exposure Control/ Personal Protection

>> 8 hr Time Weighted Avg (TWA): 1 mg/cu m. /Copper dusts and mists, as Cu/

>> 0.2 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> (respirable fraction): 0.01 mg/m

Inhalation Risk:

>> Evaporation at 20 °C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed, especially if powdered.

Effects of Short Term Exposure:

>> The is corrosive to the eyes. The substance is irritating to the respiratory tract. The substance is severely irritating to the gastrointestinal tract. Exposure could cause haemolysis, kidneys and liver impairment.

Effects of Long Term Exposure:

>> Repeated or prolonged inhalation of the aerosol may cause effects on the lungs. The substance may have effects on the liver and kidneys, resulting in impaired functions.

Fire Prevention

>> NO contact with incompatible substances. See Chemical Dangers.

Exposure Prevention

>> PREVENT DISPERSION OF DUST! STRICT HYGIENE!

Inhalation Prevention

>> Use local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety goggles in combination with breathing protection.

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

9. Physical And Chemical Properties

Molecular Weight:

>> 249.69

Exact Mass:

>> 248.934150

Physical Description:

>> Copper sulfate pentahydrate appears as blue crystalline granules or powder. Melting point 110 °C (with decomposition). Non-combustible. Nauseating metallic taste. Odorless. White when dehydrated. (NTP, 1992)

>> BLUE SOLID IN VARIOUS FORMS.

Color/Form:

>> Large, blue or ultramarine, triclinic crystals or blue granules or light-blue powder

Odor:

>> Odorless

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> Nauseous, metallic taste

Boiling Point:

>> 1207 °F at 760 mmHg (decomposes) (NTP, 1992)

Melting Point:

>> 297 °F (dehydrates) (NTP, 1992)

Solubility:

>> greater than or equal to 100 mg/mL at 70 °F (NTP, 1992)

>> Solubility in water, g/l at 20 °C: 317 (freely soluble)

Density:

>> 2.284 (NTP, 1992) - Denser than water; will sink

>> 2.3 g/cm³

Stability/Shelf Life:

>> INDEFINITE WHEN KEPT DRY; STABLE TO HEAT, COLD, & LIGHT.

Decomposition:

>> DECOMP ABOVE 150 °C (BOILING POINT) WITH -5H2O /SPR: TO ANHYDROUS SALT/

>> 110 °C

Corrosivity:

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Very corrosive to plain steel.

pH:

pH is an expression of hydrogen ion concentration in water. Specifically, pH is the negative logarithm of hydrogen ion (H+) concentration (mol/L) in an aqueous solution. The term is used to indicate basicity or acidity of a solution on a scale of 0 to 14, with pH 7 being neutral.

>> pH of 0.2 molar aq soln: 4.0

Refractive Index:

>> INDICES OF REFRACTION: 1.514, 1.537, 1.543

10. Stability And Reactivity

>> Slowly effloresces in air. Water soluble.

11. Toxicological Information

Exposure Routes:

ightarrow The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

Inhalation Exposure

>> Cough. Sore throat.

Eye Exposure

>> Redness. Pain. Blurred vision. Burns.

Ingestion Exposure

>> Abdominal pain. Burning sensation. Nausea. Vomiting. Diarrhoea. Shock or collapse.

Interactions:

>> MAY CAUSE DRAMATIC INCR IN MORTALITY OF TURKEYS GIVEN BLACKHEAD CONTROL DRUGS CONTAINING ARSENIC & EXPOSED TO BLACKHEAD.

Antidote and Emergency Treatment:

>> Basic treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for shock and treat if necessary For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal /Copper and related compounds/

Human Toxicity Excerpts:

>> A report of 11 patients who had ingested an estimated 1 to 50 g of copper sulfate: they suffered nausea & vomiting, with epigastric pain in 5, diarrhea in 5, hypotension in 2, hematemesis or melena in 10, pallor in 10, jaundice in 8, delirium in 3, & coma in 2. All had intravascular hemolysis & developed oliguria or anuria. Five patients died despite gastric lavage, intravenous fluids, mannitol, diuretics, and dialysis. /Copper sulfate/

Non-Human Toxicity Excerpts:

>> ... PARAKERATOSIS, WITH SOFTENING OF HAIR & PRURITIS, FOLLOWED BY DRY EXCEMATOUS-LIKE SKIN CHANGES & PAPULAR ERUPTIONS /WERE OBSERVED/ IN PIGS FED DIET CONTAINING 0.1% HYDRATED COPPER SULFATE.

>> LD50 RABBITS PERCUTANEOUS > 8.0 G/KG

12. Ecological Information

ICSC Environmental Data:

>> The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. Bioaccumulation of this chemical may occur along the food chain, for example in fish. It is strongly advised not to let the chemical enter into the environment.

13. Disposal Considerations

Spillage Disposal

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance, protective gloves, protective clothing and safety goggles. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

Disposal Methods

- >> SRP: At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices.
- >> Add slowly to a large container of water. Stir in slight excess of soda ash. Let stand for 24 hr. Decant or siphon into another container and neutralize with 6 M HCl before washing down drain with large excess of water. The sludge may be added to landfill. Recommendable methods: Precipitation, solidification, & landfill. Peer-review: Precipitate with calcium hydroxide. Dilute supernatant and discharge to sewer. Copper can be recovered by cation exchange. (Peer-review conclusions of an IRPTC expert consultation (May 1985))

14. Transport Information

DOT

Copper sulfate pentahydrate

ΙΑΤΑ

Copper sulfate pentahydrate

15. Regulatory Information

Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> EPA 1300 ug/l (Action Level) /Copper/

Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> EPA 1000 ug/l /Copper/

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations. /Copper and cmpd/

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Sulfuric acid, copper(2+) salt (1:1), pentahydrate

New Zealand EPA Inventory of Chemical Status

>> Copper sulphate, pentahydrate: Does not have an individual approval but may be used under an appropriate group standard

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - Sulfuric acid, copper(2+) salt (1:1), pentahydrate: Human health tier I assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."