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Safety Data Sheet

1. Chemical product and company identification

Product name	:	Copper(Ⅱ) sulfate

Company information

Name of manufacturer	:	KANTO CHEMICAL CO., INC.
Address	:	2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP
Name of section	:	Business Administration Department, Reagent Division
Telephone number	:	+81-3-6214-1090
Facsimile number	:	+81-3-3241-1047
Mail address	:	BC32@kanto.co.jp
Reference No	:	07518
Recommended use	:	For research use only
Restrictions on use	:	Seek expert judgment when using the product for applications other than those recommended.

2. Hazards identification

GHS classification

Health hazards	Acute toxicity (oral)	Category 3
	Skin corrosion/irritation	Category 1C
	Serious eye damage/eye irritation	Category 1
	Skin sensitization	Category 1
	Reproductive toxicity	Category 2
	Specific target organ toxicity (single exposure)	Category 1 (nervous system, blood, liver, kidney)
	Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation.)
	Specific target organ toxicity (repeated exposure)	Category 1 (respiratory organs)
	Specific target organ toxicity (repeated exposure)	Category 2 (liver)
Environmental hazards	Aquatic acute	Category 1
	Aquatic chronic	Category 1

Hazard pictograms

Signal word : Danger

Hazard statements :
Toxic if swallowed
Causes severe skin burns and eye damage
May cause an allergic skin reaction
May cause respiratory irritation
Suspected of damaging fertility or the unborn child
Causes damage to organs (nervous system, blood, liver, kidney)

Causes damage to organs (respiratory organs) through prolonged or repeated exposure
May cause damage to organs (liver) through prolonged or repeated exposure
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

Precautionary statements

Prevention : Do not handle until all safety precautions have been read and understood.
Do not breathe dust.
Wash hands, forearms and face thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.

Response : IF SWALLOWED: Immediately call a POISON CENTER or doctor.
IF SWALLOWED: Rinse mouth. Do not induce vomiting.
IF ON SKIN: Wash with plenty of water.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Call a POISON CENTER or doctor.
IF exposed or concerned: Get medical advice/attention.
Immediately call a POISON CENTER or doctor.
Call a POISON CENTER or doctor if you feel unwell.
Get medical advice/attention if you feel unwell.
If skin irritation or rash occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
Collect spillage.

Storage : Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

3. Composition/information on ingredients

Distinction of substance or mixture : Substance

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Copper(Ⅱ) sulfate	≥ 97.5	CuSO4	Listed	231-847-6	7758-98-7

4. First aid measures

First aid measures

First-aid measures after inhalation	:	Remove the victim to fresh air, and make him blow his nose and gargle.
First-aid measures after skin contact	:	Wash the affected areas under running water, get medical treatment as soon as possible.
First-aid measures after eye contact	:	Wash the affected areas under running water for at least 15 minutes. Get medical treatment.
First-aid measures after ingestion	:	Rinse mouth with water. Give the victim one or two glasses of water or milk. Do not induce vomiting. Get medical treatment as soon as possible.
Personal Protection in First Aid and Measures	:	Rescuers should wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

Suitable extinguishing media	:	This product is noncombustible.
Unsuitable extinguishing media	:	None
Fire hazard	:	Thermal decomposition emits harmful copper (Ⅱ) oxide fume.
Firefighting instructions	:	Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.
Personal protection (Emergency response)	:	Firefighters should wear protective equipment.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

General measures	:	Wear proper protective equipment and avoid contact with skin and inhalation of dust. Conduct operations from upwind and evacuate people downwind.

Environmental precautions

Environmental precautions	:	Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.

Methods and Equipment for Containment and Cleaning up

For containment	:	Sweep up in a chemical waste container. Neutralize residue with calcium hydroxide or sodium carbonate water solution and then flush contaminated area with copious amounts of water.

7. Handling and storage

Handling

Technical measures	:	Wear appropriate protective equipment to avoid contact with skin or inhalation of dust.
Precautions for safe handling	:	Avoid formation of dust and aerosols.

Storage

Storage conditions	:	Store the bottle tightly closed in a cool, dark place because the substance is hygroscopic.
Material used in packaging/containers	:	Glass, polyethylene, polypropylene.

8. Exposure controls / Personal protection equipment

ACGIH TWA	Not established

Appropriate engineering controls : Install a local ventilation system in case of dusty condition.

Protective equipment

Respiratory protection : If necessary, wear dust mask

Hand protection : Impervious protective gloves

Eye protection : Safety goggles

Skin and body protection : Protective clothing, protective boots

9. Physical and chemical properties

Physical state : Solid

Color : White - grayish white

Odor : Odorless

pH : The aqueous solution is acidic.

Melting point : 200 ° C

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Auto-ignition temperature : No data available

Decomposition temperature : 600 - 700 ° C (It releases sulfur trioxide and becomes copper(Ⅱ) oxide)

Flammability : Non flammable.

Vapor pressure : No data available

Relative density : 3.603 (20/4℃)

Density : No data available

Relative gas density : No data available

Solubility : Organic solvents: Insoluble in ethanol.
Water: 12.5 % (0℃)

Partition coefficient n-octanol/water (log Pow) : No data available

Explosive limits (vol %) : No data available

Viscosity, kinematic : No data available

Particle characteristics : No data available

10. Stability and reactivity

Reactivity : May react with alkaline substances.

Chemical stability : Stable under normal conditions. Hygroscopic.

Possibility of hazardous reactions : Stable under normal conditions of use.

Conditions to avoid : Light, heat, moisture.

Incompatible materials : Alkaline substances.

Hazardous decomposition products : Sulfur oxides, copper(Ⅱ) oxide.

11. Toxicological information

Acute toxicity (oral)	:	Toxic if swallowed rat LD50=300mg/kg
Acute toxicity (dermal)	:	Classification not possible
Acute toxicity (inhalation)	:	No classification (gas) No classification (vapor) Classification not possible (dust, mist)
Skin corrosion/irritation	:	Causes severe skin burns There are reports on the strong irritation and corrosivity in humans and reports that it is markedly irritating to the skin and causes redness and pain. From these results, this substance was classified into category 1C.
Serious eye damage/irritation	:	Causes serious eye damage There are reports on the strong irritation and corrosivity in humans and reports that it is markedly irritating to the skin and causes redness and pain. From these results, this substance was classified into category 1.
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	May cause an allergic skin reaction In humans, there are many reports suggesting that skin sensitization occurred when a 0.5-5.0% aqueous solution or petrolatum-containing mix of this substance was applied for 24-48 hours in patch tests. Also copper and its compounds are classified in occupational skin sensitizers group 2 by Japan Society for Occupational Health. Therefore, this substance was classified into category 1.
Germ cell mutagenicity	:	No classification As for in vivo, this substance showed positive and negative results in micronucleus tests with mouse bone marrow cells, and positive in a chromosome aberration test with mouse bone marrow cells. However, the positive results of the in-vivo micronucleus test and chromosomal aberration test were done by intraperitoneal administration. As for in vitro, bacterial reverse mutation tests gave negative results. In SIAP, based on the negative findings on the pentahydrate of this substance in in-vivo micronucleus tests with mice and an in vivo unscheduled DNA synthesis test with rats, it was evaluated that "Copper and copper compounds are not genotoxic."
Carcinogenicity	:	Classification not possible
Reproductive toxicity	:	Suspected of damaging fertility or the unborn child There are no data on this substance itself, but there are data of its hydrate. That is, because in the test on mice using the pentahydrate, developmental effects including malformations were observed at a dose highly likely to cause maternal toxicity, this substance was classified into category 2.

STOT-single exposure	:	Causes damage to organs (nervous system, blood, liver, kidney) May cause respiratory irritation In humans, multiple cases are reported where in a single oral intake in a suicide attempt or accidental ingestion of this substance, nausea, vomiting, upper abdominal pain, diarrhea, hematemesis or melena, reduced blood pressure, delirium, coma, jaundice, intravascular hemolysis, oliguria, and anuria were caused. In addition, multiple cases were reported in which centrilobular necrosis and biliary stasis in the liver, and renal glomerular congestion and detachment of renal tubule cells in the kidney were observed. As for experimental animals, it is reported that acute toxicity symptoms due to single oral intake of copper compounds including this substance are salivation, vomiting, diarrhea, gastric hemorrhage, increased heart rate, hypotension, hemolytic anemia, convulsions, and paralysis etc.. In addition, there is a report that in a single exposure test in which guinea pigs were exposed by inhalation to the aerosol of this substance, decreased cilia movement in the respiratory tract was observed. Therefore, this substance was classified into category 1 (nervous system, blood, liver, kidney), category 3 (respiratory tract irritation).
STOT-repeated exposure	:	Causes damage to organs (respiratory organs) through prolonged or repeated exposure May cause damage to organs (liver) through prolonged or repeated exposure As for humans, there is a report that an occupational disease called "vineyard sprayer's lung" was seen in vineyard workers spraying antifungal agents containing 1-2.5% of copper sulfate neutralized with slaked lime, and findings similar to silicosis were observed, and as common findings from alveolar lavage and biopsy, intraalveolar desquamation of macrophages, histiocytic and noncaseating granulomas containing inclusions of copper, and restorative lesions in the form of fibrohyaline nodules were included. There is a report that in a 92-day repeated oral toxicity study with rats dosed by feeding, at or above 2000 mg/kg diet, which is within the guidance value range for category 2, hyperplasia of the limiting ridge and hyperkeratosis of the forestomach, and hepatic inflammation were observed. Therefore, this substance was classified into category 1 (respiratory organs), category 2 (liver).
Aspiration hazard	:	Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute	:	Very toxic to aquatic life Thymallus arcticus LC50=0.006mg/L/96h
Aquatic chronic	:	Very toxic to aquatic life with long lasting effects Chlamydomonas reinhardtii NOEC=0.013mg/L/72h

Persistence and degradability

No additional information available

Bioaccumulative potential

No additional information available

Mobility in soil

No additional information available

Hazardous to the ozone layer

Ozone : Classification not possible

13. Disposal considerations

Ecological waste information : Disposal should be made by one of following methods. Or entrust approved waste disposal companies with the disposal.
Precipitation method :
Dissolve in water and add alkaline substances like calcium hydroxide or sodium carbonate to precipitate copper hydroxide or copper carbonate. Filter the precipitation and bury in a landfill site approved for hazardous-waste disposal.

Roasting method :
In case of a large amount of the chemical, recover metal copper by roast reduction method.

<Note>
＊The pH of the neutralization should be above 8.5. The precipitation does not form completely below pH 8.5.
＊In case of disposal by roasting method, it is desirable to entrust to disposal companies.

14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG)	:	2923
Proper Shipping Name (IMDG)	:	CORROSIVE SOLID, TOXIC, N.O.S.
Packing group (IMDG)	:	III
Transport hazard class(es) (IMDG)	:	8 (6.1)

Air transport(IATA)

UN-No. (IATA)	:	2923
Proper Shipping Name (IATA)	:	Corrosive solid, toxic, n.o.s.
Packing group (IATA)	:	III
Transport hazard class(es) (IATA)	:	8 (6.1)
Marine pollutant	:	Applicable
MFAG-No	:	154

15. Regulatory information

Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

16. Other information

Data sources : Encyclopaedia Chimica, Kyoritsu Shuppan Co, Ltd. (1963) .
Handbook of Poisonous and Deleterious substances, revised and enlarged edition, Yakumu Kohosa (2000) .
Handbook of 17322 Chemical Products, The Chemical Daily Co. (2022) .
NITE Chemical Risk Information Platform (NITE-CHRIP), National

Institute of Technology and Evaluation.

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully.The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements.The information herein is only provision of information, and it does not represent a guarantee the properties of the product.The Safety Data Sheet(SDS) is prepared based on JIS Z7253.