

MATERIAL SAFETY DATA SHEET**1. PRODUCT AND COMPANY IDENTIFICATION**

Product name	Copper Sulfate (Industrial / High purity)
Chemical formula	CuSO ₄ ·5H ₂ O
Manufacturer	SUMITOMO METAL MINING CO., LTD. NON-FERROUS METALS DIV./ADMINISTRATION DEPT. 3-5-3, NISHIBARA-CHO, NIIHAMA, EHIME, 792-8555 JAPAN TEL +81- 897-37-4817 FAX +81- 897-37-4910
Product use	Pesticides for crop protections, Pigments, Electric cells, Medicine, Metallurgy, Raw material of Cupper salts, Cupper plating, Adjectives, Cupper-ammonium process of Rayon, Analytical agents and Skin-tanning.

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS:

Explosives	Outside scope of the classification
Flammable gases	Outside scope of the classification
Flammable aerosols	Outside scope of the classification
Oxidizing gases	Outside scope of the classification
Gases under pressure	Outside scope of the classification
Flammable liquids	Outside scope of the classification
Flammable solids	Not classified
Self-reactive substances and mixtures	Not classified
Pyrophoric liquids	Outside scope of the classification
Pyrophoric solids	Not classified
Self-heating substances and mixtures	Not classified
Substances and mixtures which, in contact with water, emit flammable gases	Not classified
Oxidizing liquids	Outside scope of the classification
Oxidizing solids	Classification not possible
Organic peroxides	Outside scope of the classification
Corrosive to metals	Classification not possible

HEALTH HAZARDS:

Acute toxicity - Oral	Category 4
Acute toxicity - Dermal	Not classified
Acute toxicity - Inhalation (gases)	Outside scope of the classification
Acute toxicity - Inhalation (vapors)	Classification not possible
Acute toxicity - Inhalation (dust, mist)	Classification not possible
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A-2B
Respiratory sensitization	Classification not possible
Skin sensitization	Category 1
Germ cell mutagenicity	Category 2

Carcinogenicity	Classification not possible
Reproductive toxicity	Category 2
Specific target organ toxicity (Single exposure)	Category 1 (hematic system, liver, nervous system, kidney, respiratory system)
	Category 3 (Respiratory tract irritation)
Specific target organ toxicity (Repeated exposure)	Category 1 (hematic system, liver, kidney, respiratory system)
Aspiration hazard	Category 2 (liver)
ENVIRONMENTAL HAZARDS:	Classification not possible
Hazardous to the aquatic environment – Acute toxicity	Category 1
Hazardous to the aquatic environment – Chronic toxicity	Classification not possible

HAZARDS EXCLUDED FROM THE GHS CLASSIFICATION CATEGORIES

PHYSICAL HAZARDS

- Upon heating, decompose and generate hazardous and corrosive fume of SO_x.
- The solution is weak acid. React with many metals under existence of water.

HEALTH HAZARDS

- If inhaled: may cause paralysis of motor and sensory nerves, irregular breathing or arrhythmia.
- If swallowed; may cause vomiting, headache or diarrhea.

PICTOGRAM



SIGNAL WORD DANGER

HAZARD STATEMENT

- Harmful if swallowed.
- Skin irritation.
- Strong eye irritation.
- May cause an allergic skin reaction.
- Suspected of causing genetic defects.
- Suspected of damaging fertility or the unborn child.
- Causes damage to organs. <hematic system, liver, nervous system, kidney, respiratory organs>
- May cause respiratory irritation.
- Causes damage to organs. <hematic system, kidney, respiratory organs> and may cause damage to organs<liver> through prolonged or repeated exposure.
- Very toxic to aquatic life.

PRECAUTIONARY STATEMENTS

[Prevention]

- Do not handle until all safety precautions have been read and understood.

- Use only outdoors or in a well-ventilated area and use local exhaust.
- Do not breath dust or fume.
- Wear personnel protection. (safety gloves, glasses or face shield)
- Contaminated work clothing should not be allowed out of the workplace.
- Do not eat, drink, or smoke during work.
- Wash hands thoroughly after handling.
- Avoid release to the environment. Collect spillage.

[Response]

- If inhaled: Remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if you feel unwell.
- If on skin: Wash with plenty of water and soap. If induced skin irritation or rash, get medical attention.
- Wash contaminated clothing before reuse.
- If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
- If swallowed: Get medical attention if you feel unwell. Rinse mouth.
- If exposed or concerned ; Get medical attention.

[Storage]

- Keep container tightly closed and store in a cool, well-ventilated place.
- Prevent the water leak and keep away from the heat source.

[Disposal]

- Please consult us about the possibility of recycling.
- Disposal should be in accordance with applicable regional, national and local laws and regulations.

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS No.	TSCA	EINECS	% w/w
Copper sulfate	7758-99-8	Listed	231-847-6	>99.0%

4. FIRST AID MEASURES

Eye contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Skin contact	Rinse immediately with plenty of water and take off all contaminated clothing and shoes. If skin irritation or rash occurs, get medical attention. Wash contaminated clothing before reuse.
Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if you feel unwell.
Ingestion	Rinse mouth. Get medical attention.

5. FIRE FIGHTING MEASURES

Flammable properties	
Flash point	No data available.
Extinguishing media	

Suitable extinguishing media	This substance is nonflammable. Use adequate extinguishing agents for surrounding fire.
Protection of firefighters	Wear adequate respiratory protection and chemical clothing (heat resistance).
Protective equipment and precautions for firefighters	In case of fire, irritating or toxic fumes or gases may be generated. Move container from fire area, if it can be done without risk.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Wear adequate respiratory protection and chemical clothing. (heat resistance) Immediately isolate the spilled area with adequate distance for all directions. Wear adequate protector refer to Section 8 and avoid contact with eyes and skin or inhaling. Keep unnecessary and unprotected personnel from entering.
Environmental precautions	Do not let this substance enter the environment. Avoid entering the river or affecting to the environment.
Method for clean-up	Sweep diffused spillage and place in an empty container. Residual substances are collected completely with care and moved to a safe place. Sweep up spillage and place in a sealable empty container for later disposal. Treat with solution of calcium hydrate or sodium carbonate, and then wash plenty of water. Prevent the high concentration spillage release to the river.

7. HANDLING AND STORAGE

Handling	Wear protective equipment and set the engineering controls refer to Section 8. Local exhaust or general ventilation may be necessary. (Refer to Section 8) Avoid breathing dust, fume or mist. Wear personnel protection (safety gloves, grasses or face shield) Use only outdoors or in a well-ventilated area and use local exhaust. Do not eat, drink or smoke during work.
Storage	Keep container tightly closed and store in a cool, well-ventilated place. Store locked up. Prevent the water leak and keep away from the heat source.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines	<JSOH> Not established (2007) . <ACGIH> Not established (2007) .
Engineering controls	Provide local exhaust. Use the gas detector for sulfur dioxide gas. Keep container tightly closed and store in a cool, well-ventilated place.
Personal protective equipments	
Respiratory protection	Wear respiratory protection.
Skin protection	Wear protective gloves. Wear protective clothing or safety shoes.
Eye / face protection	Wear eye protection. (e.g. A pair of goggles)
General hygiene considerations	Do not eat, drink or smoke during work. Wash hands thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Crystal
Color	Clear navy blue
Odor	No data available.
pH	No data available.
Melting point	150°C (loss of water of crystallization)
Boiling point	650°C (decompose)
Flash point	No data available.
Explosive range	No data available.
Vapor pressure	No data available.
Vapor density	No data available
Specific gravity	2.28 (16°C)
Solubility in water	20.2g/100g Water (20°C)
Solubility	Soluble in glycerin or methanol. Methanol;15.6g/100g(18°C).
Partition Coefficient:	No data available.
n-octanol/water	
Auto-ignition point	No data available.
Decomposition temperature	No data available.
Odor threshold	No data available.
Evaporation rate	No data available.
Flammability (solid, gas)	No data available.
Viscosity	No data available.

10. STABILITY AND REACTIVITY

Chemical stability	Stable under normal condition.
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Conditions to avoid	No information available.
Incompatible materials	No information available.
Possibility of hazardous reactions	Upon heating, decompose and generate hazardous and corrosive fume of SO _x . The solution is weak acid. React with many metals.
Hazardous decomposition products	Upon heating, form SO _x gas.

11. TOXICOLOGICAL INFORMATION

Acute toxicity - Oral	LD ₅₀ 960 mg/kg (rat)
Acute toxicity - Dermal	LD _{LO} 2000 mg/kg (rat)
Acute toxicity - Inhalation	No data available.
Skin corrosion/irritation	Erythema or sore are observed in man. May cause irritation to the skin.
Serious eye damage/eye irritation	In humans, sore, erythema or bleary eyes are reported. So, this substance may irritate to the eyes.
Respiratory sensitization	No data available
Skin sensitization	May be skin sensitizer. (humans) As copper or its compounds are listed as Group 2 by the Japan Society of Occupational Health and listed as skin sensitizing substances by the Japanese Society of Occupational Allergy.
Germ cell mutagenicity	In vivo Chromosomal Aberration Test using somatic cell was negative.
Carcinogenicity	Not listed by IARC, NTP, OSHA or ACGIH as a carcinogen.
Reproductive toxicity	There is no information about general toxicity of parent animals. The malformation and developmental effects are observed in pups.

Specific target organ toxicity (Single exposure)	If inhaled: In humans, may cause paralysis of motor and sensory nerves, irregular breathing and arrhythmia. If swallowed; may cause vomiting, headache or diarrhea. In another report, observed vomiting, lethargy, acute hemolytic anemia, renal and liver dysfunction, neurotoxicity, hypertension, and tachypnoea. Reported in humans, suppression of central nervous system and death caused by hepatic and renal failure. Acute lung inflammation is observed in animal experiment. The target organs may be hematic system, liver, nervous system, kidney and respiratory system.
Specific target organ toxicity (Repeated exposure)	In humans, hemolytic anemia and histo-pathological changes in the lung are observed, such as inflammation, granuloma, fibro-hyaline nodule, disappearance of macrophage or progressive chronic fibrosis. Hyaline droplet on proximal tubule of kidney, hematological effects as microcytic anemia or the enzymatic parameter of biochemistry especially increase of alanine aminotransferase (ALT) are observed in animal experiments. ALT is the index of primary liver dysfunction. Also repeated or prolonged exposure may cause damage on lung. The target organs are hematic system, kidney, liver and respiratory system.
Aspiration hazard	No data available.

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment - Acute toxicity	LC ₅₀ (48h) 0.00272mg/l(Ceriodaphnia quadrangula)
Hazardous to the aquatic environment - Chronic toxicity	No data available
	This substance is metal. No data about the bioconcentration is available in the water.

13. DISPOSAL CONSIDERATIONS

- Please consult us about the possibility of recycling.
- Disposal should be in accordance with applicable regional, national and local laws and regulations.
- When order to dispose the remainder to the private or public waste disposer, inform

them of the physico-chemical and health hazards of this substance.

- Container should be cleaned up prior to recycling or dispose in accordance with applicable regional, national and local standard method.
- Empty container should be cleaned up prior to disposal.

14. TRANSPORT INFORMATION (not meant to be all-inclusive)

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (COPPER SULFATE)
UN Number	UN3077
Class	9
Sub Risk	-
Packing Group	III

15. REGULATORY INFORMATION (not meant to be all-inclusive)

TSCA Inventory	Listed
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This product is followed by the competent regulations in an applicable country or region.

16. OTHER INFORMATION

Reference

- 1 WHO/IPCS: Environmental Health Criteria (EHC) No.200 (1998)
- 2 US NIOSH: Registry of Toxic Effects of Chemical Substances (RTECS) (2006)
- 3 IPCS ; ICSC Card (2004)
- 4 15170 Chemical commodities. The Chemical Daily Co. Ltd. <Japanese>
- 5 JSOH; Recommendation of Occupational Exposure Limits. J. Occup. Health. (2007)
<Japanese>
- 6 JSOEA; J. Occup. Environ. Allergy, (2004) <Japanese>
- 7 US NTP ; NTP Database Search (Access on July, 2006)
- 8 USDHHS; The Agency for Toxic Substances and Disease Registry (ATSDR)
Toxicological Profiles. (2004)
- 9 CERL ; Hazard data sheet 2001-59 (2002) <Japanese>
- 10 European Center of Ecotoxicology and Toxicology of Chemicals (ECETOC) ; Technical
Report No. 91 (2003)
- 11 GHS Classification of Nickel (Chemical Management Center, National Institute of
Technology and Evaluation ; <http://www.safe.nite.go.jp/english/dbi.html> , 2007)

This information only concerns the above-mentioned product and does not need to be valid if used with other(s) or in any process. The information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

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