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Safety Data Sheet

1. Chemical product and company identification

Product name	:	Sulfur, crystal

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	:	37385
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

Physical hazards	Flammable solids	Category 2
Health hazards	Specific target organ toxicity (single exposure)	Category 1 (respiratory tract)
	Specific target organ toxicity (repeated exposure)	Category 2 (respiratory organs, skin)

Hazard pictograms

Signal word	:	Danger
Hazard statements	:	Flammable solid Causes damage to organs (respiratory tract) May cause damage to organs (respiratory organs, skin) through prolonged or repeated exposure

Precautionary statements

Prevention	:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Do not breathe dust. Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection.
Response	:	IF exposed or concerned: Call a POISON CENTER or doctor. Get medical advice/attention if you feel unwell.
Storage	:	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
Sulfur	≥ 99.5	S	Listed	231-722-6	7704-34-9

4. First aid measures

First aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately get medical treatment.

First-aid measures after skin contact : Wash the affected areas under running water.

First-aid measures after eye contact : Wash the affected areas under running water.

First-aid measures after ingestion : Give the victim water immediately. Call a physician immediately.

Personal Protection in First Aid and Measures : Rescuers should wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

Suitable extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand, foam

Unsuitable extinguishing media : None

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.

Fight fire from windward.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Foam extinguisher is effective for a large scale fire.

Personal protection (Emergency response) : Wear breathing apparatus.

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 damage to the environment by flowing of spillage to rivers.

Methods and Equipment for Containment and Cleaning up

For containment : Sweep up the chemical and place in a chemical waste container.

Prevention Measures for Secondary Accidents	:	Remove nearby sources of ignition and prepare extinguishing media.

7. Handling and storage

Handling

Technical measures	:	Wear appropriate protective equipment to avoid contact with skin or inhalation of dust. Fire is prohibited.
Precautions for safe handling	:	Avoid formation of dust and aerosols. Do not allow contact with oxidizing substances.

Storage

Storage conditions	:	Store in a dark, cool place and tightly closed.
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	:	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	:	Light yellow
Odor	:	Odorless
pH	:	No data available
Melting point	:	119 ° C
Freezing point	:	No data available
Boiling point	:	445 ° C
Flash point	:	160 ° C (C.C.)
Auto-ignition temperature	:	232 ° C
Decomposition temperature	:	No data available
Flammability	:	Flammable
Vapor pressure	:	No data available
Relative density	:	No data available
Density	:	2.1 g/cm^3
Relative gas density	:	7.837 (470℃)
Solubility	:	Water: Insoluble. Organic solvents: Slightly soluble in ethanol, benzene, ethyl ether.
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	:	Corrodes copper and copper compounds. At high temperatures, it reacts with most metals except gold and platinum, as well as hydrogen, to form sulfides. May react violently when in contact with oxidizing substances.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Dust may form flammable and explosive mixture with air.
Conditions to avoid	:	Light, heat.
Incompatible materials	:	Oxidizing substances.
Hazardous decomposition products	:	Sulfur oxides.

11. Toxicological information

Acute toxicity (oral)	:	No classification rat LD50>3000 mg/kg
Acute toxicity (dermal)	:	No classification rat LD50>2000 mg/kg
Acute toxicity (inhalation)	:	No classification (gas) Classification not possible (vapor) No classification (dust, mist) rat LC50>9.23 mg/L
Skin corrosion/irritation	:	No classification Based on a result of not irritating in a rabbit irritation test (OECD TG404 (GLP)) where irritation score was "0" in all rabbits after application of 80% wettable powder to the skin, the substance was classified as "No classification".
Serious eye damage/irritation	:	No classification Based on a result of not irritating in a rabbit irritation test (OECD TG405 (GLP)) where irritation score was "0" in all rabbits after application of 80% wettable powder to the eye, the substance was classified as "No classification".
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	Classification not possible
Germ cell mutagenicity	:	Classification not possible Although induction of chromosome aberrations in germ cell of guinea pigs and induction of chromosome damage in rat embryos were observed, these tests are invalid since the experimental procedures are not commonly used and the detailed data are not clear. Additionally, there is a negative result in a rat bone marrow chromosome aberration test, but the detailed data are unclear. Therefore, classification was not possible due to lack of appropriate data from in vivo mutagenicity tests. As relevant information, from in vitro mutagenicity tests, there is a report of a negative Ames test.
Carcinogenicity	:	Classification not possible
Reproductive toxicity	:	Classification not possible

STOT-single exposure	:	Causes damage to organs (respiratory tract) It is reported that exposure to sulfur particulates produces tracheobronchitis, characterized by cough, sore throat, and chest pain in humans. Additionally, it is reported that acute effects of sulfur inhalation include catarrhal inflammation of nasal mucosa, which may lead to hyperplasia and tracheobronchitis is a frequent occurrence with dyspnea, persistent cough and expectoration which is sometimes streaked with blood. Based on these information, the substance was classified into category 1 (respiratory tract).
STOT-repeated exposure	:	May cause damage to organs (respiratory organs, skin) through prolonged or repeated exposure It is reported that workers exposed to atmospheric sulphur for 2.0 - 2.5 years exhibited frequent nosebleeds, bronchitis and impaired lung function. Additionally, it is reported that mine workers exposed to sulfur dust and sulfur dioxide often had chronic sinus effects and respiratory disturbances. Based on this information found in a document in List 2, the substance was classified into category 2 (respiratory system). There are reports that development of comedones was reported in some workers exposed to sulfur dust and skin may be subject to erythematous and eczematous lesions and signs of ulceration in workers whose hands are in prolonged or repeated contact with powdered sulfur. There is a report of an animal test where dermal application of 10% test substance to rabbits for 2 weeks resulted in hyperkeratosis and formation of comedones. Based on this information found in a document in List 2, the substance was classified into category 2 (skin).
Aspiration hazard	:	Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute	:	No classification Mysida LC50=736 mg/L/96h
Aquatic chronic	:	Classification not possible

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	:	Bury in a landfill site approved for the disposal of chemical and hazardous wastes. Or entrust approved waste disposal companies with the disposal.
Contaminated container and packaging	:	In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG)	:	1350
Proper Shipping Name (IMDG)	:	SULPHUR
Packing group (IMDG)	:	III
Transport hazard class(es) (IMDG)	:	4.1

Air transport(IATA)

UN-No. (IATA)	:	1350
Proper Shipping Name (IATA)	:	Sulphur
Packing group (IATA)	:	III
Transport hazard class(es) (IATA)	:	4.1
Marine pollutant	:	Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollutant category	:	Z
MFAG-No	:	133

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 : NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.
Encyclopaedia Chimica, Kyoritsu Shuppan Co, Ltd. (1963) .
Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .

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.