Issue date: 7/28/2003
Revision date: 3/28/2024

Safety Data Sheet

1. Chemical product and company identification

Product name : Zinc oxide

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 : 48041
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	Reproductive toxicity	Category 2
	Specific target organ toxicity (single exposure)	Category 1 (respiratory organs, systemic toxicity)
Environmental hazards	Aquatic acute	Category 1
	Aquatic chronic	Category 1

Hazard pictograms

Signal word : Danger

Hazard statements : Suspected of damaging fertility or the unborn child
Causes damage to organs (respiratory organs, systemic toxicity)
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.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.

Response : IF exposed or concerned: Call a POISON CENTER or doctor.
IF exposed or concerned: Get medical advice/attention.
Collect spillage.

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
Zinc oxide	≥ 99	ZnO	Listed	215-222-5	1314-13-2

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.
First-aid measures after eye contact	:	Wash the affected areas under running water.
First-aid measures after ingestion	:	Give the victim water or salt water and make him vomit. Get medical attention.
Personal Protection in First Aid and Measures	:	Rescuers should wear proper protective equipment like rubber gloves, goggles.

Most Important Symptoms/Effects

Symptoms/effects	:	Inhalation cause throat ache, headache, fever, nausea, vomiting, weakness, chill, myalgia. Theses symptoms may be late to develop.

5. Fire fighting measures

Suitable extinguishing media	:	This product is noncombustible.
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.
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 damage to the environment by flowing of spillage to rivers.

Methods and Equipment for Containment and Cleaning up

For containment : Collect up spills as much as possible and transfer in a chemical container. Wash the spillage area thoroughly with water.

7. Handling and storage

Handling

Technical measures : If necessary, wear appropriate protective equipment to avoid contact with skin or inhalation of vapor.

Precautions for safe handling : Avoid formation of dust and aerosols.

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	2 mg/m³ (R)
ACGIH STEL	10 mg/m³ (R)

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

Odor : Odorless

pH : No data available

Melting point : ≈ 2000 ° C (Under pressure)

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability : Non flammable.

Vapor pressure : No data available

Relative density : 5.47 - 5.78

Density : No data available

Relative gas density : No data available

Solubility : Water: 0.0004 % (18℃)

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

Explosive limits (vol %)	:	No data available
Viscosity, kinematic	:	No data available
Sublimation point	:	≈ 1725 ° C (starts sublimation at 1300 ° C at 1 atm)
Particle characteristics	:	No data available

10. Stability and reactivity

Reactivity	:	It is stable to heating, but it forms a complex oxide at high temperatures with cobalt (II) oxide or barium oxide.
Chemical stability	:	Stable under normal conditions. Absorbs carbon dioxide and produces zinc carbonate.
Possibility of hazardous reactions	:	There are many cases of poisoning due to inhalation of fume during heating work.
Conditions to avoid	:	Light, heat.
Incompatible materials	:	Oxidizing substances.
Hazardous decomposition products	:	fume.

11. Toxicological information

Acute toxicity (oral)	:	No classification rat LD50>5000mg/kg
Acute toxicity (dermal)	:	No classification rabbit LD50>5000mg/kg
Acute toxicity (inhalation)	:	No classification (gas) No classification (vapor) No classification (dust, mist) rat LC50>5.7mg/L/4h
Skin corrosion/irritation	:	No classification In a test using rabbits, no dermal reactions were noted after the application (ear) of 500 mg during 24-hour under occlusion. No signs of skin irritation were noted after open or occlusive application of 0.5 mL on the dorsal skin of rabbits for 5 consecutive days.
Serious eye damage/irritation	:	No classification In a test (OECD TG405) where 3 rabbits were treated by instillation into the conjunctival sac, no corneal opacity was observed, iridial irritation (grade 1) was observed in 1 animal at 1-hour only, conjunctivae redness (grade 1 - 2) was seen in all animals and completely resolved at 72-hour, chemosis (grade 2) and discharge (grade 1) were observed in all animals at 1-hour only.
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	No classification Three well-performed skin sensitizing tests in guinea pigs (Maximization test: Directive 96/54/EC B.6, OECD TG406) were reported. The positive rates were 1) 40% (4/10) in experimental group, 0% (0/5) in control group, 2) 0% (0/10) in experimental group, 20% (1/5) in control group, and 3) 0% (0/10) in experimental group, 0% (0/5) in control group. While the first test produced conflicting results (positive rate of 40%), the weight of evidence does not indicate that zinc oxide is a very potent sensitizing agent. In a patch test for contact allergy, no positive responses were observed in the 14 patients when only zinc oxide was used.

Germ cell mutagenicity	:	Classification not possible There is a report of positive results from a rat bone marrow chromosomal aberration test following exposure by inhalation for 5 months (in vivo somatic cell mutagenicity test). The results are hard to interpret since only a slight increase was seen, the experimental procedures employed are not commonly used, and the observed aberration was aneuploidy such as hyperdiploid cells. As relevant information, from in vitro mutagenicity tests, there are reports of a negative Ames test, a positive mouse lymphoma gene mutation test.
Carcinogenicity	:	No classification EPA classifies the group I (Information of the substance is not sufficient to assess human carcinogen.)
Reproductive toxicity	:	Suspected of damaging fertility or the unborn child In a rat test, the administration of 0.4% in diet for 21 days prior to mating until day 15 of gestation resulted in resorptions of all fetuses. In rats administered in diet from day 0 of gestation to day 14 of lactation, stillborn pups were observed at 2000 ppm and higher concentrations. Since the manifestation of maternal general toxicity was not denied at the above toxic levels, the substance was classified into category 2.
STOT-single exposure	:	Causes damage to organs (respiratory organs, systemic toxicity) Numerous cases of metal fume fever caused by inhalation exposure of zinc oxide micro dusts are reported and symptoms such as cough, chest pain, chill, fever, dyspnea, muscular pain and nausea may occur. Since metal fume fever presents mainly symptoms in the respiratory system, the substance was classified into category 1 (lung, systemic toxicity).
STOT-repeated exposure	:	Classification not possible
Aspiration hazard	:	Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute	:	Very toxic to aquatic life Daphnia magna EC50=0.098mg Zn/L/48h
Aquatic chronic	:	Very toxic to aquatic life with long lasting effects Pseudokirchneriella subcapitata NOEC=24μg Zn/L/72h

Persistence and degradability

No additional information available

Bioaccumulative potential

Low bioconcentration
BCF : 19-110 (2.5mg/L), ≤172-217 (0.25mg/L)

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.

Landfill disposal method :
Harden with cement and bury in a landfill site approved for hazardous waste disposal.

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

<Note>
＊The disposal of roasting method is desirable to entrust disposal companies.

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)	:	3077
Proper Shipping Name (IMDG)	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Packing group (IMDG)	:	III
Transport hazard class(es) (IMDG)	:	9

Air transport(IATA)

UN-No. (IATA)	:	3077
Proper Shipping Name (IATA)	:	Environmentally hazardous substance, solid, n.o.s.
Packing group (IATA)	:	III
Transport hazard class(es) (IATA)	:	9
Marine pollutant	:	Applicable
MFAG-No	:	171

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) .
Dangerous Properties of Industrial Materials,6th ed. N.I.Sax Van Nostrand Reinhold Company (1984) .
Handbook of dangeroous and hazardous chemicals, Japan Industrial Safety & Health Association. (2000-2001) .
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.