Issue date: 10/21/2003
Revision date: 4/21/2025

Safety Data Sheet

1. Chemical product and company identification

Product name : ε-Caprolactam

Company information

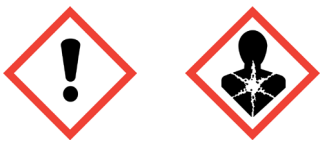
Name of manufacturer	:	KANTO CHEMICAL CO., INC.
Address	:	2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP
Name of section	:	Business Administration Department, Reagent Division
Telephone number	:	+81-3-6214-1090
Facsimile number	:	+81-3-3241-1047
Mail address	:	BC32@kanto.co.jp
Reference No	:	07125
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 4
	Acute toxicity (dermal)	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Reproductive toxicity	Category 2
	Specific target organ toxicity (single exposure)	Category 2 (nervous system)
	Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation)
	Specific target organ toxicity (repeated exposure)	Category 1 (respiratory organs)

Hazard pictograms



Signal word : Danger

Hazard statements : Harmful if swallowed or in contact with skin
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
Suspected of damaging fertility or the unborn child
May cause damage to organs (nervous system)
Causes damage to organs (respiratory organs) through prolonged or repeated exposure

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. Wear protective gloves/protective clothing/eye protection/face protection.
Response	:	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. IF ON SKIN: Wash with plenty of 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. Call a POISON CENTER or doctor if you feel unwell. Get medical advice/attention if you feel unwell. Rinse mouth. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
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
Synonyms	:	6-Amino-n-caproic acid lactam, Cyclohexanone isooxime, 6-Hexanolactam, 2‐Oxohexamethyleneimine

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
ε-Caprolactam	≥ 98	C6H11NO	Listed	203-313-2	105-60-2

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 for at least 15 minutes. If necessary, 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.

Most Important Symptoms/Effects

Symptoms/effects	:	If inhaled, causes irritation to mucosa, upper respiratory tract, and effect central nervous system.

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)	:	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. Flush contaminated area with copious amounts of water.
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.
Precautions for safe handling	:	Avoid formation of dust and aerosols. Do not allow contact with oxidizing substances.

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	5 mg/m³ (IFV)

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	:	White
Odor	:	Odorless
pH	:	No data available
Melting point	:	66 - 73 ° C
Freezing point	:	No data available
Boiling point	:	267 ° C
Flash point	:	125 ° C (O.C.)
Auto-ignition temperature	:	375 ° C
Decomposition temperature	:	No data available
Flammability	:	Flammable
Vapor pressure	:	0.26 Pa (25℃)
Relative density	:	1.02 (75/4℃)
Density	:	No data available
Relative gas density	:	3.9
Solubility	:	Water: Soluble. Organic solvent: Soluble in ethanol, diethyl ether, benzene.
Partition coefficient n-octanol/water (log Pow)	:	0.66
Explosive limits (vol %)	:	1.4 - 8 vol %
Viscosity, kinematic	:	No data available
Particle characteristics	:	No data available

10. Stability and reactivity

Reactivity	:	Ring-opening polymerization in the presence of water, alkali metals and Grignard reagents yields nylon 6. May react with oxidizing 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	:	Oxidizing substances.
Hazardous decomposition products	:	Carbon monoxide, nitrogen oxides.

11. Toxicological information

Acute toxicity (oral)	:	Harmful if swallowed rat LD50=1475 mg/kg

Acute toxicity (dermal)	:	Harmful in contact with skin rabbit LD50=1410 mg/kg
Acute toxicity (inhalation)	:	No classification (gas) Classification not possible (vapor) No classification (dust, mist) rat LC50=8.14 mg/L/4h
Skin corrosion/irritation	:	Causes skin irritation Based on a description that this substance is a skin irritant , and a report that it is slightly irritating in a skin irritation test with rabbits, it was classified into category 2.
Serious eye damage/irritation	:	Causes serious eye irritation Since there is a report that it showed moderate irritation in an eye irritation test with rabbits, and there is no information on the recovery period, it was classified into category 2A.
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	No classification Based on a description that no response showing sensitization was observed in a sensitization test with humans and a report that both of two sensitization tests with guinea pigs were negative, it was classified as "No classification."
Germ cell mutagenicity	:	No classification As for in vivo, a mouse spot test gave an ambiguous result, a micronucleus test and a chromosomal aberration test with mouse bone marrow cells were negative, a sister chromatid exchange test with bone marrow cells of mice was negative, a DNA damage test with liver cells of rats and an unscheduled DNA synthesis test with liver cells and spermatocytes of rats were negative. As for in vitro, a bacterial reverse mutation test, a gene mutation test, a mouse lymphoma test, a micronucleus test, a chromosomal aberration test, and a sister chromatid exchange test with mammalian cultured cells were negative.
Carcinogenicity	:	No classification IARC classifies it as group 3 (not classifiable as to its carcinogenicity to humans).
Reproductive toxicity	:	Suspected of damaging fertility or the unborn child In developmental toxicity tests with rats by the oral and inhalation routes, at doses of maternal toxicity or at doses where maternal toxicity is unknown, an increase in deaths of embryos/fetuses was observed, and in addition, effects on fertility (a decrease in the fertility index, a decrease in litter size) were found in the inhalation route, therefore, it was classified into category 2.

STOT-single exposure	:	May cause damage to organs (nervous system) May cause respiratory irritation As for humans, there is a report that in an inhalation exposure at 68 mg/m3, an irritation effect on the sensory nerve was observed, and it is described that it is irritating to the respiratory tract. As for experimental animals, there is a report that in a single oral dose test with rats, although there is no description of the doses, clonic convulsions were observed. As LD50 values in this study were reported to be 1475 mg/kg in females, and 1875 mg/kg in males, the symptoms are considered to be observed at doses in the range of category 2 near the LD50 values. In addition, there is a report that in a single oral dose test with rabbits, at 1000 mg/kg, muscle twitching, opisthotonus and intense muscle cramps were observed, and all the animals died, and in a single oral dose test with cats, at 1000 mg/kg, excitement, salivation, and repetitive severe muscle cramps were caused and the cats died after 2 hours. For the inhalation route, there is a report that in a 4-hour aerosol inhalation exposure test with rats, the main symptoms were closed eyes, piloerection, and irregular breathing. Although there is no description of the dose at which the symptoms were observed, it is considered to exceed the range for category 2 near 8.1 mg/L of the LC50 value. From the above, it was classified into category 2 (nervous system), category 3 (respiratory tract irritation).
STOT-repeated exposure	:	Causes damage to organs (respiratory organs) through prolonged or repeated exposure As for humans, there is a report that although exposure concentrations are unknown, six cases were reported which had respiratory organs damages related to exposure to the mist which was released from nylon 6 processing machinery in which this substance was used as a raw material, after irritation of the eye, nose, and upper respiratory tract, respiratory organs lesions containing symptoms of bronchus hyperreactivity, asthmatic reactions, and decreased lung function were observed, and this substance is considered to be a causal substance. As for experimental animals, in a 13-week toxicity test in which rats were exposed by inhalation to the aerosol, at or above 70 mg/m3 within the guidance value range for category 2, moderate hypertrophy and hyperplasia in the goblet cells of the nasoturbinal mucosa, accumulation of eosinophilic material in the mucosal epithelial cells, slight squamous metaplasia and hyperplasia in the pharyngeal region ventral epithelium were observed, and at 243 mg/m3, keratinization of the metaplastic epithelium in the pharyngeal region ventral epithelium was observed. Other than these, as for the oral route, multiple repeated oral toxicity tests with rats or mice dosed by feeding for 13 weeks to two years were performed, and in some cases, renal lesions which are specific to male rats were observed at a dose within the guidance value range for category 2, but no effects which are available for evidence of the classification were observed. From the above, it was classified into category 1 (respiratory organs).
Aspiration hazard	:	Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute	:	No classification Pseudokirchneriella subcapitata EC50>1000 mg/L/72h

Aquatic chronic	:	No classification Pseudokirchneriella subcapitata NOEC=1000 mg/L/72h

Persistence and degradability

Readily biodegradable
BOD : 82%

Bioaccumulative potential

Low bioconcentration
BCF : 3.2

Mobility in soil

High mobility
Koc : 57

Hazardous to the ozone layer

Ozone	:	Classification not possible

13. Disposal considerations

Ecological waste information	:	Mixed with flammable organic solvents and burn in a chemical incinerator equipped with an afterburner and a scrubber. 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)	:	Not applicable
Proper Shipping Name (IMDG)	:	Not applicable
Packing group (IMDG)	:	Not applicable
Transport hazard class(es) (IMDG)	:	Not applicable

Air transport(IATA)

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

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

Pollutant category	:	Z

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) . Dictionary of Organic Compounds, The society of Synthetic

Organic Chemistry, Kodansha Ltd. (1985).
Handbook of 17625 Chemical Products, The Chemical Daily Co. (2025).

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.