



Safety Data Sheet

1. Identification of the substance/mixture and of the company/undertaking

Product identifier:

Product name: ε -Caprolactam

SDS No. : 1421E-2

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

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2. Hazards identification

GHS classification and label elements of the product

Classification of the substance or mixture

HEALTH HAZARDS

Acute toxicity (Oral): Category 4

Acute toxicity (Dermal): Category 4

Skin corrosion/irritation: Category 2

Serious eye damage/eye irritation: Category 2

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 system)

Label elements



Signal word: Danger

HAZARD STATEMENT

Harmful if swallowed

Harmful in contact with skin

Causes skin irritation

Causes serious eye irritation

Suspected of damaging fertility or the unborn child

May cause damage to organs after single exposure(nervous system)

May cause respiratory irritation

Causes damage to organs through prolonged or repeated exposure(respiratory system)

PRECAUTIONARY STATEMENT

Prevention

Do not breathe dust/fume/gas/mist/vapors/spray.

Use only outdoors or in a well-ventilated area.

Wash contaminated parts thoroughly after handling.

Wear protective gloves or protective clothing.

Wear eye protection/face protection.

Do not eat, drink or smoke when using this product.

Response



Get medical advice/attention if you feel unwell.
IF exposed or concerned: Get medical advice/attention.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF exposed or concerned: Call a POISON CENTER or doctor/physician.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
IF SWALLOWED: Rinse mouth.

Storage

Store in a well-ventilated place. Keep container tightly closed.

Disposal

Dispose of contents/container in accordance with local/national regulation.

3. Composition/information on ingredients**Mixture/Substance selection:****Substance**

Ingredient name: ε -Caprolactam

Content (%):99(min)

Chemical formula:C6H11NO

Chemicals No, Japan:5-1097

CAS No.:105-60-2

MW:113.16

ECNO:203-313-2

Note : The figures shown above are not the specifications of the product.

4. First-aid measures**Descriptions of first-aid measures****General measures**

Get medical attention/advice if you feel unwell.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN (or hair)

Take off immediately all contaminated clothing. Rinse skin with water/shower.

Wash with plenty of soap and water.

If skin irritation or rash occurs: Get medical advice/attention.

IF IN EYES

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

IF SWALLOWED

Rinse mouth.

Call a POISON CENTER or doctor/physician if you feel unwell.



5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media suitable for surrounding facilities.

Unsuitable extinguishing media

Unsuitable extinguishing media data is not available.

Specific hazards arising from the substance or mixture

Containers may explode when heated.

Fire may produce irritating, corrosive and/or toxic gases.

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire/flame resistant/retardant clothing.

Wear protective gloves/protective clothing/eye protection/face protection.

Firefighters should wear self-contained breathing apparatus with full face piece operated positive pressure mode.

6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses or low areas.

Methods and materials for containment and cleaning up

Sweep up, place in a bag and hold for waste disposal.

Preventive measures for secondary accident

Collect spillage.

7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

Do not breathe dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

(Exhaust/ventilator)

Exhaust/ventilator should be available.

(Safety treatments)

Avoid contact with skin.

Avoid contact with eyes.

Safety Measures

Use only outdoors or in a well-ventilated area.

Wear protective gloves, protective clothing or face protection.

Wear eye protection/face protection.

When using do not eat, drink or smoke.

Any incompatibilities

See "10.Stability and Reactivity"

Advice on general occupational hygiene

Wash contaminated parts thoroughly after handling.

Do not eat, drink or smoke when using this product.



Take off contaminated clothing and wash it before reuse.

Storage

Conditions for safe storage

Keep container tightly closed.

Store in a cool, dry place. Do not store in direct sunlight.

Container and packaging materials for safe handling

Glass

Polyethylene

8. Exposure controls/personal protection

Control parameters

Adopted value

(ε -Caprolactam)

ACGIH(1997) TWA: 5mg/m³(IFV) (URT irr)

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.

Washing facilities should be available.

Individual protection measures

Respiratory protection

Wear respiratory protection.

Hand protection

Wear protective gloves.

Eye protection

Wear eye/face protection.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Crystals or flakes

Color: White

Odor: Slightly characteristic odor

Melting point/Freezing point: 70°C

Boiling point or initial boiling point: (ε -Caprolactam)267°C

Boiling range data is not available.

Flammability (gases, liquids and solids) data is not available.

Lower and upper explosion limit/flammability limit:

Lower explosion limit: 1.4 vol %

Upper explosion limit: 8 vol %

Flash point: (ε -Caprolactam)(O.C.) 125°C

Auto-ignition temperature: (ε -Caprolactam)375°C

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: good

n-Octanol/water partition coefficient: log Pow=0.19

Vapor pressure: 0.26 Pa (25°C)

Density and/or relative density: 1.02

Relative vapor density (Air=1): 3.91

Relative density of the Vapor/air - mixture at 20°C (Air = 1): 1

No Particle characteristics data is not available.



10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Hygroscopic (absorbs moisture from the air).

Possibility of hazardous reactions

Decomposes on heating. This produces toxic fumes including nitrogen oxides and ammonia.

Reacts violently with strong oxidants. This produces toxic fumes. (ICSC 0118)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

Strong oxidizing agents

Hazardous decomposition products

Carbon oxides, Nitrogen oxides, Ammonia

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[GHS Cat. Japan, base data]

(ε -Caprolactam)

rat LD50=1475mg/kg (female), 1876mg/kg (male) (SIDS, 2003)

Acute toxicity (Dermal)

[GHS Cat. Japan, base data]

(ε -Caprolactam)

rabbit LD50=1410mg/kg (NITE primary risk assessment, 2007)

Acute toxicity (Inhalation)

[GHS Cat. Japan, base data]

(ε -Caprolactam)

mist: rat LC50=8.14mg/L/4hr (ACGIH 7th, 2003), 8.16mg/L/4hr (SIDS, 2003)

Irritant properties

Skin corrosion/irritation

[GHS Cat. Japan, base data]

(ε -Caprolactam)

Skin irritant (DFGOT vol. 4, 1992); rabbit mild irritation (NITE primary risk assessment, 2007); EU Skin Irrit. 2 (ECHA CL Invt., Access on Jun. 2017)

Serious eye damage/irritation

[GHS Cat. Japan, base data]

(ε -Caprolactam)

rabbit moderate irritation (NITE primary risk assessment, 2007); EU eyes Irrit. 2 (ECHA CL Invt., Access on Jun. 2017)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenicity

(ε -Caprolactam)

IARC-Gr.3 : Not Classifiable as a Human Carcinogen

(ε -Caprolactam)

ACGIH-A5(1997) : Not Suspected as a Human Carcinogen

Reproductive toxicity

[GHS Cat. Japan, base data]

(ε -Caprolactam)



cat. 2; NITE primary risk assessment, 2007; SIDS, 2003; MOE risk assessment, vol. 3, 2004; ACGIH 7th, 2003; Hyg. Sanit., 34, 28-31, 1969

STOT

STOT-single exposure

[cat.2]

[GHS Cat. Japan, base data]

(ε -Caprolactam)

nervous system (SIDS, 2003; NITE primary risk assessment, 2007)

[cat.3 (resp. irrit.)]

[GHS Cat. Japan, base data]

(ε -Caprolactam)

respiratory tract irritation (SIDS, 2003; NITE primary risk assessment, 2007)

STOT-repeated exposure

[cat.1]

[GHS Cat. Japan, base data]

(ε -Caprolactam)

respiratory system (MOE risk assessment vol.3, 2004; NITE primary risk assessment, 2007; SIDS, 2003)

Aspiration hazard data is not available.

12. Ecological Information

Ecotoxicity

Aquatic toxicity

Hazardous to the aquatic environment (Acute)

[GHS Cat. Japan, base data]

(ε -Caprolactam)

Algae (*Pseudokirchneriella subcapitata*) EC50 >1000mg/L/72hr (MOE Japan, 2017); Crustacea (*Daphnia magna*) EC50 >500mg/L/48hr (OECD SIDS, 2001); Fish (*Oryzias*) LC50 >100mg/L/96hr (MOE Japan, 2017; MOE Japan, 2004; NITE primary risk assessment, 2007)

Hazardous to the aquatic environment (Long-term)

[GHS Cat. Japan, base data]

(ε -Caprolactam)

Algae (*Pseudokirchneriella subcapitata*) NOEC (Speed method)=1000mg/L/72hr (MOE Japan, Ecological impact test, 2017), Crustacea (*Daphnia magna*) NOEC (Reproductive inhibition)=100mg/L/21days (MOE Japan, Environment risk assessment vol. 3, 2004)

Water solubility

(ε -Caprolactam)

77.2 g/100 ml (PHYSPROP_DB, 2005)

Persistence and degradability

(ε -Caprolactam)

Degrade rapidly (BOD_Degradation : 82% (CSCL DB, 1983))

Bioaccumulative potential

(ε -Caprolactam)

log Pow=-0.19 (ICSC, 2009); Log Kow=-0.19 (MOE Environment risk assessment, vol. 3, 2004)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.



13. Disposal considerations

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging

Waste treatment methods

Dispose of contents/container in accordance with local/national regulation.

14. Transport Information

UN No. or ID No.: Not applicable

Not applicable to IMDG Code

Not applicable to IATA Dangerous Goods Regulations

Environmental hazards

MARPOL Annex III – Prevention of pollution by harmful substances

Marine pollutants (yes/no) : no

MARPOL Annex V – Prevention of pollution by garbage discharge

Specific target organ toxicity – repeated exposure: cat.1

ε -Caprolactam

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemicals listed in TSCA Inventory

ε -Caprolactam

Other regulatory information

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information

GHS classification and labelling

Acute Tox. 4: H302 Harmful if swallowed

Acute Tox. 4: H312 Harmful in contact with skin

Skin Irrit. 2: H315 Causes skin irritation

Eye Irrit. 2: H319 Causes serious eye irritation

Repr. 2: H361 Suspected of damaging fertility or the unborn child

STOT SE 2: H371 May cause damage to organs after single exposure

STOT SE 3: H335 May cause respiratory irritation

STOT RE 1: H372 Causes damage to organs through prolonged or repeated exposure

Reference Book

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 21th edit., 2019 UN

IMDG Code, 2018 Edition (Incorporating Amendment 39-18)

IATA Dangerous Goods Regulations (62nd Edition) 2021

2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2020 TLVs and BEIs. (ACGIH)

Supplier's data/information

General Disclaimer

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The



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data does not signify any warranty with regard to the products' properties.
The GHS classification data given here is based on current Japan official data (NITE published in 2019).