

Safety Data Sheet

epsilon-Caprolactone

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1. Identification

Product identifier used on the label

epsilon-Caprolactone

Recommended use of the chemical and restriction on use

Recommended use*: Chemical used in synthesis and/or formulation of industrial products

Recommended use*: Monomer.

Unsuitable for use: Not intended for sale to or use by the general public.

* The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:

BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

Telephone: +1 973 245-6000

Emergency telephone number

24 Hour Emergency Response Information

CHEMTREC: 1-800-424-9300

BASF HOTLINE: 1-800-832-HELP (4357)

Other means of identification

Molecular formula: (CH₂)₅CO.O

Chemical family: heterocyclic, lactone

Synonyms: EPSILON CAPROLACTONE

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

Eye Irrit.

2A

Eye irritation

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Label elements

Pictogram:



Signal Word:
Warning

Hazard Statement:
H319 Causes serious eye irritation.

Precautionary Statements (Prevention):
P280 Wear eye and face protection.
P264 Wash contaminated body parts thoroughly after handling.

Precautionary Statements (Response):
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P311 If eye irritation persists: Call a POISON CENTER or physician.

Hazards not otherwise classified

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

caprolactone
CAS Number: 502-44-3
Content (W/W): ≥ 99.0 - $\leq 100.0\%$
Synonym: 2-Oxepanone; Hexan-6-olide, Caprolactone

4. First-Aid Measures

Description of first aid measures

General advice:
Remove contaminated clothing.

If inhaled:
Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. If breathing difficulties develop, aid in breathing and seek immediate medical attention.

If on skin:
Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

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If in eyes:

Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing. Seek medical attention.

If swallowed:

Rinse mouth and then drink 200-300 ml of water. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11., Further symptoms are possible

Information on: caprolactone

Symptoms: Overexposure may cause:, Eye irritation, skin irritation, erythema, nausea, headache, vomiting, dizziness, diarrhea, abdominal cramps

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:

water spray, alcohol-resistant foam, dry powder, carbon dioxide

Unsuitable extinguishing media for safety reasons:

water jet

Special hazards arising from the substance or mixture

Hazards during fire-fighting:

carbon oxides, nitrogen oxides

The substances/groups of substances mentioned can be released in case of fire. Under certain conditions in case of fire other hazardous combustion products may be generated. Pressure inside container is increased when heated, and may cause explosion.

Advice for fire-fighters

Protective equipment for fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

If without risk, remove intact containers from exposure to fire, or spray unopened containers with water mist to keep cool. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

Impact Sensitivity:

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Remarks: Based on the chemical structure there is no shock-sensitivity.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Avoid contact with skin and eyes. Use personal protective clothing.

Use personal protective clothing. Information regarding personal protective measures, see section 8.
Avoid contact with eyes. Ensure adequate ventilation. Do not breathe vapour/spray.

Environmental precautions

Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For large amounts: Dike spillage. Pump off product.

For residues: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).

Dispose of absorbed material in accordance with regulations. Wear suitable protective equipment.
Ensure that storage and workrooms are adequately ventilated.

7. Handling and Storage

Precautions for safe handling

Ensure thorough ventilation of stores and work areas. Protect against moisture. Keep container tightly sealed. Extract when the product is heated.

Protection against fire and explosion:

Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

Conditions for safe storage, including any incompatibilities

Segregate from acids and bases.

Suitable materials for containers: Stove-lacquer RDL 50

Further information on storage conditions: Containers should be stored tightly sealed in a dry place.
Keep container dry because product takes up the humidity of air.

Storage stability:

Storage duration: 24 Months

8. Exposure Controls/Personal Protection

No substance specific occupational exposure limits known.

Advice on system design:

Provide local exhaust ventilation to maintain recommended P.E.L.

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Personal protective equipment

Respiratory protection:

Wear respiratory protection if ventilation is inadequate.

Hand protection:

Chemical resistant protective gloves should be worn to prevent all skin contact., Consult with glove manufacturer for testing data., Protective glove selection must be based on the user's assessment of the workplace hazards.

Eye protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:

Wear protective clothing as necessary to prevent contact. When using, do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. Store work clothing separately.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	perceptible, bitter almond-like	
Odour threshold:	not determined	
Colour:	colourless to yellow	
pH value:	6 - 8 (10 %(m), 20 °C)	
Melting point:	-2 °C	(measured)
solidification	-25 °C	(measured)
temperature:		
Boiling point:	241 °C (1,013 hPa)	(measured)
Flash point:	111 °C	(Directive 92/69/EEC, A.9, closed cup) (derived from flash point)
Flammability:	hardly combustible	
Lower explosion limit:	For liquids not relevant for classification and labelling. The lower explosion point may be 5 - 15 °C below the flash point.	
Upper explosion limit:	9 %(V) Literature data. For liquids not relevant for classification and labelling.	(air)
Autoignition:	384 °C	(DIN EN 14522)
Vapour pressure:	0.81 hPa (25 °C)	(OECD Guideline 104)
Density:	1.07 g/cm3 (20 °C)	(OECD Guideline 109)

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Vapour density:	> 1 (20 °C) Heavier than air.	(estimated)
Partitioning coefficient n-octanol/water (log Pow):	0.32 (20 °C)	(OECD Guideline 117)
Self-ignition temperature:	Based on its structural properties the product is not classified as self-igniting.	
Thermal decomposition:	229 °C, 133 kJ/kg (DSC (DIN 51007)) 420 °C, 42 kJ/kg (DSC (DIN 51007))	
Viscosity, dynamic:	6.5 mPa.s (20 °C) 4.0 mPa.s (40 °C)	(OECD Guideline 114) (OECD Guideline 114)
Particle size:	The substance / product is marketed or used in a non solid or granular form.	
Solubility in water:	> 1,000 g/l	
Solubility (qualitative):	miscible	
Molar mass:	solvent(s): organic solvents, 114 g/mol 114.07 g/mol 114.14 g/mol	
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.	

10. Stability and Reactivity

Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:

No corrosive effect on metal.

Oxidizing properties:

Based on its structural properties the product is not classified as oxidizing. (other)

Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.
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Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

No hazardous reactions known.

Conditions to avoid

Avoid humidity. See SDS section 7 - Handling and storage.

Incompatible materials

acids, Alkalines

Hazardous decomposition products

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Decomposition products:

Hazardous decomposition products: No hazardous decomposition products known.

Thermal decomposition:

229 °C, 2.5 K/min (DSC (DIN 51007))

420 °C, 2.5 K/min (DSC (DIN 51007))

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: Virtually nontoxic after a single skin contact. Of low toxicity after single ingestion.

Oral

Type of value: LD50

Species: rat

Value: > 2,000 mg/kg (Guideline 92/69/EEC, B.1)

Inhalation

Species: rat

Value: (IRT)

Exposure time: 8 h

The vapour was tested.

No mortality within the stated exposition time as shown in animal studies.

Dermal

Type of value: LD50

Species: rabbit

Value: 5,990 mg/kg

Assessment other acute effects

Assessment of STOT single:

Apart from effects causing lethality, no specific target organ toxicity was observed in experimental studies.

Irritation / corrosion

Assessment of irritating effects: Not irritating to the skin. Eye contact causes irritation.

Skin

Species: rabbit

Result: non-irritant

Method: OECD Guideline 404

Literature data.

Eye

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Species: rabbit
Result: Irritant.
Method: OECD Guideline 405

Sensitization

Assessment of sensitization: Skin sensitizing effects were not observed in animal studies.

Mouse Local Lymph Node Assay (LLNA)

Species: mouse
Result: Non-sensitizing.
Method: OECD Guideline 429

Aspiration Hazard

not applicable

Chronic Toxicity/Effects

Repeated dose toxicity

Assessment of repeated dose toxicity: After repeated exposure the prominent effect is local irritation.

Genetic toxicity

Assessment of mutagenicity: No mutagenic effect was found in various tests with bacteria and mammalian cell culture. The substance was not mutagenic in a test with mammals.

Carcinogenicity

Assessment of carcinogenicity: No data was available concerning carcinogenic activity. The chemical structure does not suggest a specific alert for such an effect.

Reproductive toxicity

Assessment of reproduction toxicity: The results of animal studies gave no indication of a fertility impairing effect.

Teratogenicity

Assessment of teratogenicity: No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Medical conditions aggravated by overexposure

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See SDS section 11 - Toxicological information.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

There is a high probability that the product is not acutely harmful to aquatic organisms. Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations.

Toxicity to fish

LC50 (96 h) 280 mg/l, *Poecilia reticulata* (OECD 203; ISO 7346; 84/449/EWG, C.1, static)

The details of the toxic effect relate to the nominal concentration.

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Aquatic invertebrates

EC50 (48 h) 204 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)

The details of the toxic effect relate to the nominal concentration.

Aquatic plants

EC50 (72 h) 2,616 mg/l (growth rate), Desmodesmus subspicatus (OECD Guideline 201, static)

The details of the toxic effect relate to the nominal concentration.

Chronic toxicity to fish

Study scientifically not justified.

Chronic toxicity to aquatic invertebrates

Study scientifically not justified.

Assessment of terrestrial toxicity

Study scientifically not justified.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms

DIN 38412 Part 8 aquatic

bacterium/EC50 (16 h): 1,260 mg/l

Persistence and degradability

Assessment biodegradation and elimination (H2O)

Readily biodegradable (according to OECD criteria).

Elimination information

90 - 100 % CO₂ formation relative to the theoretical value (28 d) (OECD 301B; ISO 9439; 92/69/EWG, C.4-C) (aerobic, activated sludge, domestic)

Assessment of stability in water

In contact with water the substance will hydrolyse slowly.

Information on Stability in Water (Hydrolysis)

t_{1/2} 52.5 h (20 °C, pH value 7), (OECD Guideline 111, pH 7)

t_{1/2} 2.2 h (20 °C, pH value 9), (OECD Guideline 111, pH 9)

Bioaccumulative potential

Assessment bioaccumulation potential

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Mobility in soil

Assessment transport between environmental compartments

The substance will slowly evaporate into the atmosphere from the water surface.

Adsorption to solid soil phase is not expected.

Additional information

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Other ecotoxicological advice:
Do not release untreated into natural waters.

13. Disposal considerations

Waste disposal of substance:

Dispose of in accordance with national, state and local regulations. Incinerate in a licensed facility.
Do not discharge into waterways or sewer systems without proper authorization.

Container disposal:

Dispose of in accordance with national, state and local regulations. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

14. Transport Information

Land transport

USDOT

Not classified as a dangerous good under transport regulations

Sea transport

IMDG

Not classified as a dangerous good under transport regulations

Air transport

IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Regulatory Information

Federal Regulations

Registration status:

Chemical TSCA, US

All substances are TSCA listed and active.

EPCRA 311/312 (Hazard categories): Refer to SDS section 2 for GHS hazard classes applicable for this product.

NFPA Hazard codes:

Health: 2 Fire: 1 Reactivity: 0 Special:

Assessment of the hazard classes according to UN GHS criteria (most recent version):

Eye Dam./Irrit.	2A	Serious eye damage/eye irritation
Acute Tox.	5 (oral)	Acute toxicity

16. Other Information

SDS Prepared by:

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BASF NA Product Regulations
SDS Prepared on: 2025/02/18

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