

Material Safety Data Sheet

Version 4.1

Revision Date 01/17/2012

Print Date 06/15/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : ε-Caprolactam
 Product Number : C2204
 Brand : Aldrich
 Supplier : Sigma-Aldrich
 3050 Spruce Street
 SAINT LOUIS MO 63103
 USA
 Telephone : +1 800-325-5832
 Fax : +1 800-325-5052
 Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
 Preparation Information : Sigma-Aldrich Corporation
 Product Safety - Americas Region
 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Target Organ Effect, Toxic by inhalation., Harmful by ingestion., Skin sensitiser, Irritant

GHS Classification

Acute toxicity, Oral (Category 4)
 Acute toxicity, Inhalation (Category 4)
 Acute toxicity, Dermal (Category 5)
 Skin irritation (Category 2)
 Eye irritation (Category 2A)
 Skin sensitization (Category 1)
 Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled
H313	May be harmful in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 1
Physical hazards: 0

NFPA Rating

Health hazard: 2
Fire: 1
Reactivity Hazard: 0

Potential Health Effects

Inhalation Toxic if inhaled. Causes respiratory tract irritation.
Skin Harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Aza-2-cycloheptanone
2-Oxohexamethyleneimine

Formula : C₆H₁₁NO
Molecular Weight : 113.16 g/mol

Component		Concentration
ε-Caprolactam		
CAS-No.	105-60-2	-
EC-No.	203-313-2	
Index-No.	613-069-00-2	

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NO_x)

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
ε-Caprolactam	105-60-2	TWA	5 ppm 20 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	10 ppm 40 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	3 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	0.22 ppm 1 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	3 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	0.66 ppm 3 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Upper Respiratory Tract irritation Not suspected as a human carcinogen			

Personal protective equipment**Respiratory protection**

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	crystalline
Colour	colourless

Safety data

pH	7.0 - 8.5 at 333 g/l
Melting point/freezing point	Melting point/range: 68 - 71 °C (154 - 160 °F) - lit.
Boiling point	136 - 138 °C (277 - 280 °F) at 13 hPa (10 mmHg) - lit.
Flash point	152 °C (306 °F) - closed cup
Ignition temperature	395 °C (743 °F)
Autoignition temperature	no data available
Lower explosion limit	1.6 %(V)
Upper explosion limit	11.9 %(V)
Vapour pressure	9 hPa (7 mmHg) at 60 °C (140 °F) < 0.01 hPa (< 0.01 mmHg) at 20 °C (68 °F)
Density	1.020 g/cm ³ at 75 °C (167 °F)
Water solubility	soluble
Partition coefficient: n-octanol/water	log Pow: 0.12 at 25 °C (77 °F)
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY**Chemical stability**

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

hygroscopic

Materials to avoid

Strong oxidizing agents, Strong bases

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - rat - 1,210 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Chromodacryorrhea.

Behavioral:Convulsions or effect on seizure threshold. Nutritional and Gross Metabolic:Changes in:Body temperature decrease.

Inhalation LC50

LC50 Inhalation - rat - 300 mg/m3

LC50 Inhalation - mouse - 450 mg/m3

Remarks: Behavioral:Muscle contraction or spasticity.

Dermal LD50

LD50 Dermal - rat - > 2,000 mg/kg

Other information on acute toxicity

no data available

Skin corrosion/irritation

Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - rabbit - Moderate eye irritation - 24 h

Eyes - rabbit - Moderate eye irritation - 24 h

Respiratory or skin sensitization

May cause allergic skin reaction.

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is probably not carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 4 - Group 4: Probably not carcinogenic to humans (ε-Caprolactam)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects**Inhalation**

Toxic if inhaled. Causes respiratory tract irritation.

Ingestion

Harmful if swallowed.

Skin

Harmful if absorbed through skin. Causes skin irritation.

Eyes

Causes eye irritation.

Signs and Symptoms of Exposure

Convulsions

Synergistic effects

no data available

Additional Information

RTECS: CM3675000

12. ECOLOGICAL INFORMATION**Toxicity**

Toxicity to daphnia
and other aquatic
invertebrates

EC50 - Daphnia magna (Water flea) - 828 - 2,920 mg/l - 48 h

Toxicity to algae

EC50 - Pseudokirchneriella subcapitata (green algae) - 4,320 - 4,800 mg/l - 72 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2811 Class: 6.1

Packing group: II

Proper shipping name: Toxic solids, organic, n.o.s. (ε-Caprolactam)

Marine pollutant: No

Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1

Packing group: II

EMS-No: F-A, S-A

Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (ε-Caprolactam)

Marine pollutant: No

IATA

UN number: 2811 Class: 6.1

Packing group: II

Proper shipping name: Toxic solid, organic, n.o.s. (ε-Caprolactam)

15. REGULATORY INFORMATION

OSHA Hazards

Target Organ Effect, Toxic by inhalation., Harmful by ingestion., Skin sensitiser, Irritant

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
ε-Caprolactam	105-60-2	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
ε-Caprolactam	105-60-2	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
ε-Caprolactam	105-60-2	2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

Copyright 2012 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
