1 Identification of substance:

Product details:

Product name: epsilon-Caprolactone

Stock number:
A10299
L05637

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency information:
During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:

Description: (CAS#)
epsilon-Caprolactone (CAS# 502-44-3): 100%

Identification number(s):
EINECS Number: 207-938-1

3 Hazards identification

Hazard description:

Xi Irritant

Information pertaining to particular dangers for man and environment
R 36/38 Irritating to eyes and skin.

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

Health (acute effects) = 1
Flammability = 1
Reactivity = 1

GHS label elements

Warning

3.2/2 - Causes skin irritation.
3.3/2A - Causes serious eye irritation.

Prevention:
Wash thoroughly after handling.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:
IF ON SKIN: Wash with plenty of soap and water.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Specific treatment (see label).
If skin irritation occurs: Get medical advice/attention.
If eye irritation persists: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.

4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Product name: epsilon-Caprolactone

Seek immediate medical advice.
After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.
Measures for cleaning/collecting:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires: Keep ignition sources away.
Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Components with limit values that require monitoring at the workplace: Not required.
Additional information: No data
Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands: Impervious gloves
Eye protection: Safety glasses
Body protection: Protective work clothing.
Product name: epsilon-Caprolactone

9 Physical and chemical properties:

<table>
<thead>
<tr>
<th>General Information</th>
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<tbody>
<tr>
<td><strong>Form:</strong> Liquid</td>
</tr>
<tr>
<td><strong>Color:</strong> Colorless</td>
</tr>
<tr>
<td><strong>Odor:</strong> Not determined</td>
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<table>
<thead>
<tr>
<th>Change in condition</th>
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</thead>
<tbody>
<tr>
<td><strong>Melting point/Melting range:</strong> Not determined</td>
</tr>
<tr>
<td><strong>Boiling point/Boiling range:</strong> 96-98°C (205-208°F) (14mm Hg)</td>
</tr>
<tr>
<td><strong>Sublimation temperature / start:</strong> Not determined</td>
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</table>

<table>
<thead>
<tr>
<th>Flash point:</th>
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<tbody>
<tr>
<td>109°C (228°F)</td>
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<table>
<thead>
<tr>
<th>Ignition temperature:</th>
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<tbody>
<tr>
<td>Not determined</td>
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<table>
<thead>
<tr>
<th>Decomposition temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Danger of explosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product does not present an explosion hazard.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lower:</strong> Not determined</td>
</tr>
<tr>
<td><strong>Upper:</strong> Not determined</td>
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<table>
<thead>
<tr>
<th>Vapor pressure:</th>
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<tbody>
<tr>
<td>Not determined</td>
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<table>
<thead>
<tr>
<th>Density at 20°C (68°F):</th>
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<tbody>
<tr>
<td>1.03 g/cm³</td>
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</table>

10 Stability and reactivity

**Thermal decomposition / conditions to be avoided:**
Decomposition will not occur if used and stored according to specifications.

**Materials to be avoided:** Oxidizing agents

**Dangerous reactions:** No dangerous reactions known

**Dangerous products of decomposition:** Carbon monoxide and carbon dioxide

11 Toxicological information

**Acute toxicity:**

<table>
<thead>
<tr>
<th>LD/LC50 values that are relevant for classification:</th>
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</thead>
<tbody>
<tr>
<td><strong>Oral</strong> LD50 4290 mg/kg (rat)</td>
</tr>
<tr>
<td><strong>Dermal</strong> LD50 5990 µL/kg (rabbit)</td>
</tr>
</tbody>
</table>

**Primary irritant effect:**
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.

**Sensitization:** No sensitizing effects known.

**Subacute to chronic toxicity:**
Other than potential irritation (see above), no information on illness or injury to humans from acute or chronic exposure to this product is available.

**Additional toxicological information:**
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:

**General notes:**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

**Product:**
**Recommendation** Consult state, local or national regulations to ensure proper disposal.

**Uncleaned packagings:**
**Recommendation** Disposal must be made according to official regulations.
14 Transport information

Not a hazardous material for transportation.

DOT regulations:
- Hazard class: None

Land transport ADR/RID (cross-border)
- ADR/RID class: None

Maritime transport IMDG:
- IMDG Class: None

Air transport ICAO-TI and IATA-DGR:
- ICAO/IATA Class: None

Transport/Additional information: Not dangerous according to the above specifications.

15 Regulations

Product related hazard informations:
- Hazard symbols: Xi Irritant
- Risk phrases: 36/38 Irritating to eyes and skin.
- Safety phrases: 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. 37 Wear suitable gloves.

National regulations
- All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
- All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use: For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact: Zachariah Holt

Abbreviations and acronyms:
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
- ICAO: International Civil Aviation Organization
- ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
- GHS: Globally Harmonized System of Classification and Labelling of Chemicals
- EINECS: European Inventory of Existing Commercial Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- HMIS: Hazardous Materials Identification System (USA)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent