# Material Safety Data Sheet
## epsilon-Caprolactam

ACC# 37590

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** epsilon-Caprolactam
**Catalog Numbers:** AC108230000, AC108230010, AC108230050, AC220310000, AC220311000, AC403940000 AC403940000, AC403940010, AC403942500
**Synonyms:** 2-Oxohexamethyleneimine; 6-Aminocaproic acid lactam; 6-Aminohexanoic acid cyclic lactam; 1-Aza-2-cycloheptanone; Hexahydro-2H-azepin-2-one; Aminocaproic lactam; Caprolactam.
**Company Identification:**

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01
**For emergencies in the US, call CHEMTREC:** 800-424-9300

## Section 2 - Composition, Information on Ingredients

| CAS# | Chemical Name | Percent | EINECS/ELINCS |
|---|---|---|---|
| 105-60-2 | epsilon-Caprolactam | >99 | 203-313-2 |

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: white crystals.
**Warning!** Causes eye, skin, and respiratory tract irritation. Harmful if inhaled. May be harmful if swallowed or absorbed through the skin. Hygroscopic (absorbs moisture from the air).
**Target Organs:** Central nervous system, respiratory system, eyes, skin.

**Potential Health Effects**
**Eye:** Causes eye irritation. Vapors cause eye irritation.
**Skin:** Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause dermatitis. May be harmful if absorbed through the skin. Caprolactam was not a skin irritant to humans when applied as a 5% aqueous, olive oil, or alcohol solution, and no clear evidence was found that caprolactam produced dermatitis, although contact dermatitis was considered a possibility. In 1995, a case of allergic contact dermatitis from caprolactam exposure was diagnosed in a textile factory worker where nylon-6 was produced. Caprolactam was negative in the guinea pig maximization test.
**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.
**Inhalation:** Causes respiratory tract irritation. May cause lung damage. May cause central nervous system effects such as nausea and headache. Material has a very low vapor pressure at room temperature, so inhalation exposures are not expected unless material is heated or misted. Inhalation may also cause confusion, cough, and dizziness. In acute inhalation studies with caprolactam aerosol, rats exhibited shallow to spasmodic respiration, bloody nasal exudate, severe tremor, general circulatory congestion, and adverse effects to the lung and liver.
**Chronic:** Chronic inhalation may cause effects similar to those of acute inhalation. Animal studies indicate that the product may affect the liver and kidneys.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam.
**Flash Point:** 125 deg C ( 257.00 deg F)
**Autoignition Temperature:** 374 deg C ( 705.20 deg F)
**Explosion Limits, Lower:**1.40 vol %
**Upper:** 8.00 vol %
**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.
**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Wash area with soap and water. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid breathing vapors from heated material. Avoid contact with eyes, skin, and clothing. Avoid breathing dust. Avoid breathing spray or mist.
**Storage:** Store in a cool, dry place. Store in a tightly closed container. Store protected from moisture. Separate from oxidizing materials.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
**Exposure Limits**

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|---|---|---|---|
| epsilon-Caprolactam | 5 mg/m3 TWA (inhalable fraction and vapor) | 1 mg/m3 TWA (dust); 0.22 ppm TWA (vapor); 1 mg/m3 TWA (vapor) | none listed |

**OSHA Vacated PELs:** epsilon-Caprolactam: 1 mg/m3 TWA (dust); 5 ppm TWA (vapor); 20 mg/m3 TWA (vapor)
**Personal Protective Equipment**
**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
**Skin:** Wear appropriate protective gloves to prevent skin exposure.
**Clothing:** Wear appropriate protective clothing to prevent skin exposure.
**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals
**Appearance:** white
**Odor:** unpleasant odor
**pH:** Not available.
**Vapor Pressure:** 0.0016 mm Hg @ 25 deg C
**Vapor Density:** 3.01 (air=1)
**Evaporation Rate:**Not available.
**Viscosity:** Not available.
**Boiling Point:** 268 deg C @ 760 mm Hg
**Freezing/Melting Point:**68-71 deg C
**Decomposition Temperature:**Not available.
**Solubility:** Soluble.
**Specific Gravity/Density:**1.02 @ 75°C
**Molecular Formula:**C6H11NO
**Molecular Weight:**113.16

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. Polymerization of caprolactam is slow and not violent. It does not occur at < 100°C (212°F).
**Conditions to Avoid:** Dust generation, moisture, excess heat.
**Incompatibilities with Other Materials:** Strong oxidizing agents.
**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, carbon dioxide.
**Hazardous Polymerization:** May occur.

## Section 11 - Toxicological Information

**RTECS#:**
**CAS#** 105-60-2: CM3675000
**LD50/LC50:**
CAS# 105-60-2:
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 450 mg/m3;
Inhalation, rat: LC50 = 300 mg/m3/2H;
Oral, mouse: LD50 = 930 mg/kg;
Oral, rat: LD50 = 1210 mg/kg;

Skin, rabbit: LD50 = 1410 uL/kg;
Skin, rat: LD50 = >2 gm/kg;
.

**Carcinogenicity:**
CAS# 105-60-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No data available.
**Teratogenicity:** No data available.
**Reproductive Effects:** No data available.
**Mutagenicity:** No data available.
**Neurotoxicity:** No data available.
**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.
**Environmental:** No information available.
**Physical:** Octanol/water partition coefficient as log Pow: -0.19.
**Other:** Readily biodegradable.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
**RCRA P-Series:** None listed.
**RCRA U-Series:** None listed.

## Section 14 - Transport Information

| | US DOT | Canada TDG |
|---|---|---|
| **Shipping Name:** | Not regulated as a hazardous material | No information available. |
| **Hazard Class:** | | |
| **UN Number:** | | |
| **Packing Group:** | | |

## Section 15 - Regulatory Information

### US FEDERAL

**TSCA**
CAS# 105-60-2 is listed on the TSCA inventory.
**Health & Safety Reporting List**
CAS# 105-60-2: Effective 6/1/87, Sunset 6/1/97
**Chemical Test Rules**
None of the chemicals in this product are under a Chemical Test Rule.
**Section 12b**
None of the chemicals are listed under TSCA Section 12b.
**TSCA Significant New Use Rule**
None of the chemicals in this material have a SNUR under TSCA.
**CERCLA Hazardous Substances and corresponding RQs**
None of the chemicals in this material have an RQ.
**SARA Section 302 Extremely Hazardous Substances**
None of the chemicals in this product have a TPQ.
**SARA Codes**
CAS # 105-60-2: immediate.
**Section 313** No chemicals are reportable under Section 313.
**Clean Air Act:**
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
**Clean Water Act:**
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
**OSHA:**
None of the chemicals in this product are considered highly hazardous by OSHA.
**STATE**
CAS# 105-60-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

XN

**Risk Phrases:**

R 20/22 Harmful by inhalation and if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.

**Safety Phrases:**

**WGK (Water Danger/Protection)**

CAS# 105-60-2: 1

**Canada - DSL/NDSL**

CAS# 105-60-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 105-60-2 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 3/16/1998
**Revision #5 Date:** 3/22/2006