

	Shenzhen eSUN Industrial Co;Ltd	The Document Number	GH-FM-JZ-XM-13
	Material Safety data sheet	Revision Date	2025. 12. 10

Safety Data Sheet

1. Material Identification

Product Name: Polycaprolactone (PCL) Filament

Recommended Uses:

Medical device processing, 3D printing, extrusion molding, and experimental research.

Manufacturer/Supplier:

Shenzhen eSUN Industrial Co., Ltd.

Website: www.esunmed.com

Address: 9th Building, 3rd Floor, Yifenghua Innovation Industrial Park, Xinshi Community, Dalang Subdistrict, Longhua District, Shenzhen, China

Tel: (086)-0755-23768972

Fax: (086)-0755-26031982

Email: sales@esunmed.com

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2. Composition / Molecular Weight Information

Main Components:

Component | CAS No. | Content (%)

Polycaprolactone | 24980-41-4 | >99.9

Other additives | --- | <0.1

3. Hazard Identification

Hazard Classification:

- This product is a solid polymer material and is not classified as a hazardous chemical.
- It is not classified as a flammable solid, corrosive substance, or toxic substance.

Health Hazards:

- No known acute toxicity under normal use conditions.
- Dust or cutting debris may cause mechanical irritation.

Environmental Hazards:

- The product is biodegradable and presents no significant environmental hazards.
- Large-scale particle leakage may cause physical effects on aquatic systems.

Physical and Chemical Hazards:

- Molten material at high temperature may cause burns.
- Dust may present a very low combustible risk under specific conditions.
- This material is a bioabsorbable polymer. It should not be discarded randomly and shall be handled according to medical/industrial waste requirements.

4. First Aid Measures

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Skin Contact:

Cold material: No irritation.

- Contact with molten material may cause burns. Cool with cold water. Do not remove solidified material forcibly. Seek medical attention if necessary.

Eye Contact:

- Flush with clean water for at least 15 minutes if dust or fragments enter the eyes.
- Seek medical attention if irritation persists.

Inhalation:

- Inhalation hazards are generally unlikely.
- If excessive processing fumes are inhaled, move to fresh air.
- Seek medical attention if discomfort persists.

Ingestion:

- Small amounts are not hazardous.
- Seek medical advice if a large amount is accidentally swallowed.

5. Fire Fighting Measures

Flammability: Combustible solid.

Suitable Extinguishing Media:

Water spray, dry powder, carbon dioxide, foam extinguishers.

Hazardous Combustion Products:

Combustion may release carbon monoxide, carbon dioxide, aldehydes, and trace low molecular weight hydrocarbons. Irritating or toxic vapors may form under oxygen-deficient conditions.

Protective Equipment:

Wear self-contained breathing apparatus and full protective clothing.

6. Accidental Release Measures

Personal Precautions: None required.

Environmental Precautions: None required.

Solid Particle Leakage:

- Collect by sweeping or vacuuming.
- Prevent entry into drains or pipelines.
- Dispose of waste as biodegradable plastic waste.

Molten Material Leakage:

- Allow to cool and solidify before handling.
- Prevent burns during handling.

7. Handling and Storage

Safe Handling:

- During thermal processing (such as melt spinning and end sealing), prevent burns and keep temperature below the degradation temperature of the material (significant decomposition generally occurs above 300°C).
- Avoid accumulation of dust.

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Storage Condition

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- Store in a cool, dry, sealed, and dark place.
- Recommended humidity: <20% RH.
- Prevent moisture absorption to avoid affecting processing performance.
- Avoid contact with strong oxidizers, strong acids, and strong bases.

Explosion and Fire Prevention:

Keep away from ignition sources.

Requirements for Storage Rooms and Containers:

No special requirements.

8. Exposure Controls / Personal Protection

Exposure Guidelines:

Fiber dust should be treated as hazardous particulate matter:

ACGIH Threshold Limit Value:

Total dust: 10 mg/m³

Respirable dust: 3 mg/m³

Engineering Controls:

Local exhaust ventilation is recommended to reduce exposure to fiber dust.

Personal Protective Equipment:

Respiratory protection: Generally not required; protective masks may be used when fumes are excessive.

Hand protection: Heat-resistant gloves when handling molten material.

Eye protection: Safety goggles during cutting or processing.

Skin protection: Normal work clothing.

9. Physical and Chemical Properties

Appearance: White to slightly yellow solid filament.

Odor: Slight or odorless.

Melting point/range: 58–63°C

Softening temperature: ~55°C

Decomposition temperature: >300°C

Explosion hazard: Extremely low.

Vapor pressure: Not determined.

Explosion limits: Dust accumulation may cause dust explosion under certain conditions; precautions are required.

Density at 25°C: 1.10–1.20 g/cm³

Solubility: Insoluble in water; soluble in strong polar solvents such as chloroform.

10. Stability and Reactivity

Stability:

Stable under normal temperature and pressure conditions.

Possibility of Hazardous Reactions:

No known hazardous reactions.

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Avoid:

Excessive temperature, prolonged exposure to humidity >30%, and continuous strong UV irradiation.

Hazardous Decomposition Products:

Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, caprolactone, and low molecular weight aldehydes/ketones.

11. Toxicological Information

Biocompatibility:

PCL is a biocompatible material widely used in tissue engineering and medical devices.

Acute Toxicity:

No acute systemic toxicity has been demonstrated.

Irritation:

No irritation was observed in intradermal reaction tests.

Sensitization:

No skin sensitization was observed.

Pyrogen Response:

No pyrogenic reaction.

12. Ecological Information

- Biodegradable.
- Almost non-toxic to aquatic systems and soil.
- Large quantities of particle leakage may cause mechanical effects (e.g., blockage).

13. Disposal Considerations

Product Disposal Recommendations:

- Dispose of as biodegradable plastic or general solid waste.
- Do not discharge into sewers.

14. Transport Information

- Not classified as dangerous goods.
- Normal transportation conditions are acceptable.
- Avoid moisture, heavy pressure, and high temperature.

15. Regulatory Information

International:

US TSCA Inventory: Polycaprolactone is listed as an existing chemical substance (exempt under Polymer Exemption).

EU REACH:

The polymer itself is exempt from registration; caprolactone monomer has been registered. The product complies with EC No. 1907/2006.

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cation:

Not classified.

Australia AICS and Japan ENCS:

Listed or compliant with polymer exemption requirements.

16. Other Information

This document is intended only as supplementary information. Please use the product correctly and protect employee health and safety. This information does not constitute a warranty. Any consequences resulting from use of the product outside the recommendations of this safety data sheet or in combination with other products or processes shall be the user's responsibility.

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