

SAFETY DATA SHEET

Product Name: PEO Powder (Polyethylene Oxide)

SDS Revision Date: 15-Apr-2026

Version: 1.0

Product Code: PEO-PWD-001

Applies to: PEO (Polyethylene Oxide) high molecular weight water-soluble polymer powder.

1. Identification

1.1. Product identifier

Product Name: PEO Powder (Polyethylene Oxide)

Product Code: PEO-PWD-001

Chemical Family: Polyether (High Molecular Weight Polyethylene Glycol)

CAS Number: 25322-68-3 (Polyethylene oxide)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use: Industrial raw material for solid-state battery electrolytes, water treatment (flocculant), ceramics (binder), papermaking (retention aid), textile sizing, drag reduction agents, adhesives, and controlled drug delivery systems.

Uses Advised Against: Any use not approved by the supplier. Do not use in applications requiring continuous contact with strong oxidizing agents or temperatures exceeding 200°C.

1.3. Details of the supplier of the safety data sheet

Company Name: PolymerVerse

Address: 32 N Gould St., Sheridan, WY 82801, USA

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Contact Phone: USA: 001-800-ACROS-01 / Europe: +32 14 57 52 11

E-mail: sales@magerial.com

1.4. Emergency telephone number

USA: 001-800-ACROS-01 / Europe: +32 14 57 52 11

2. Hazard(s) identification

2.1. Classification of the substance or mixture (in accordance with GHS)

Hazard Category	Classification
Flammable Solids	Not classified (PEO is not readily combustible; however, fine powder may form combustible dust clouds)
Combustible Dust	May form explosive dust-air mixtures when finely dispersed
STOT – Single Exposure (Category 3)	May cause respiratory irritation (H335)
STOT – Repeated Exposure (Category 1)	Causes damage to lungs through prolonged or repeated inhalation of dust (H372)
Serious Eye Damage/Eye Irritation (Category 2B)	Causes eye irritation (H320)

2.2. GHS Label elements

Exclamation Mark	Health Hazard
Respiratory/eye irritation	Long-term lung damage risk

Signal Word: DANGER

Hazard Statements (H-phrases):

H320: Causes eye irritation.

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H335: May cause respiratory irritation.

H372: Causes damage to lungs through prolonged or repeated exposure (inhalation of dust).

Precautionary Statements (P-phrases):

Prevention: Avoid breathing dust (P261). Use only with adequate ventilation (P271). Wear protective gloves, eye/face protection (P280). Use explosion-proof electrical equipment where dust may be generated (P241).

Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing (P304+P340). Call a POISON CENTER or doctor if you feel unwell (P312). If eye irritation persists: Get medical advice/attention (P337+P313).

Storage: Store locked up (P405). Keep container tightly closed in a cool, dry place.

Disposal: Dispose of contents/container in accordance with local, regional, national, and international regulations (P501).

2.3. Other hazards

Fine PEO powder can form combustible dust clouds when dispersed in air in the presence of an ignition source. Thermal decomposition (during overheating > 200°C) may release irritating fumes including carbon monoxide (CO), formaldehyde, and other hydrocarbons. PEO is hygroscopic and will absorb moisture from the air; keep containers tightly sealed. Dissolved PEO solutions may be slippery and present a slip hazard.

3. Composition/information on ingredients

Ingredient	Weight %	CAS Number	EC Number
Polyethylene Oxide (PEO)	≥ 99.5%	25322-68-3	500-038-2
Molecular Weight Range	150,000 – 10,000,000+ (grade dependent)	—	—
Other additives (anti-caking agent, if present)	< 0.5%	—	—

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Note: PEO is a high molecular weight polymer. Anti-caking agents (e.g., amorphous silica) may be added at < 0.5% for powder flowability. Residual ethylene oxide monomer content is typically < 1 ppm. Batch-specific details available upon request.

4. First aid measures

4.1. Description of first aid measures

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Skin Contact: Wash with plenty of soap and water. Remove contaminated clothing. If molten material contacts skin, cool rapidly with cold water; seek medical attention for thermal burns.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses if present and easy to do. Get medical attention if irritation persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Get medical attention if discomfort occurs.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation of dust may cause respiratory tract irritation. Prolonged or repeated overexposure may lead to lung damage (pneumoconiosis). Dissolved PEO solutions create slippery surfaces.

5. Fire-fighting measures

5.1. Extinguishing media

Suitable Extinguishing Media: Dry powder, carbon dioxide (CO₂), water spray/fog, or foam. Use water spray to disperse dust and prevent dust clouds.

Unsuitable Extinguishing Media: Do not use a solid water jet (straight stream), as it can disperse and spread the dust, potentially creating an explosive dust cloud.

5.2. Special hazards arising from the substance or mixture

Dust Explosion Hazard: Finely dispersed PEO powder can form explosive mixtures with air. A primary explosion can re-suspend dust, leading to a much more powerful secondary explosion.

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Hazardous Decomposition Products: Thermal decomposition or burning may produce: carbon monoxide (CO), carbon dioxide (CO₂), formaldehyde, acetaldehyde, and other hydrocarbons.

5.3. Advice for fire-fighters

Wear self-contained breathing apparatus (SCBA) and full protective clothing. Evacuate all personnel from the danger area. Cool fire-exposed containers with water spray. Fight fire from a safe distance and upwind.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For Non-Emergency Personnel: Evacuate area immediately. Isolate immediate hazard area. Eliminate all ignition sources. Use only non-sparking tools.

For Emergency Responders: Wear full protective clothing and NIOSH-approved SCBA. Note that spilled PEO powder becomes slippery when wet.

6.2. Environmental precautions

Prevent entry into drains, sewers, and waterways. PEO is water-soluble and may increase biochemical oxygen demand (BOD) in water bodies.

6.3. Methods and material for containment and cleaning up

Do NOT dry sweep. Use only an explosion-proof vacuum cleaner or wet clean (using water or a wetting agent) to minimize dust generation. Place collected material into a clean, closed, and labeled container. Avoid creating dust clouds. Cleaned surfaces may be slippery; ensure complete removal of residues.

7. Handling and storage

7.1. Precautions for safe handling

Technical Measures: Use explosion-proof local exhaust ventilation and dust collection systems. Ensure all electrical equipment is rated for combustible dust (NFPA 70 Class II, Division 1 or 2).

Preventive Measures: Use non-sparking tools. Bond and ground equipment to prevent static discharge.

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Advice on Safe Handling: Avoid formation of dust. Handle in closed, automated systems where possible. PEO is hygroscopic; minimize exposure to ambient air during handling.

Hygiene Measures: Wash hands after handling. Do not eat, drink, or smoke in work areas.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well-ventilated area below 40°C in tightly closed original containers. Isolate from: Strong oxidizing agents, strong acids, and moisture. Keep away from heat, sparks, and ignition sources. Use explosion-proof electrical systems in storage areas. Shelf life: 12-24 months when stored in unopened original packaging under recommended conditions.

8. Exposure controls/personal protection

8.1. Control parameters

Component	Recommended Exposure Limit	Regulatory Limit (China GBZ 2.1)
Inhalable Plastic Dust	3 mg/m ³ (8-hour TWA)	1 mg/m ³ (PC-TWA)
Total Plastic Dust	10 mg/m ³ (8-hour TWA)	5 mg/m ³ (PC-TWA)
Ethylene Oxide (residual monomer)	1 ppm (as monomer, if detectable)	—

No specific ACGIH or OSHA PEL has been established for PEO. The above dust values are based on nuisance dust / particle not otherwise regulated (PNOR) limits.

8.2. Exposure controls

Engineering Controls: Provide adequate local exhaust ventilation and general ventilation to maintain airborne dust levels below the occupational exposure limits. Provide explosion-proof dust collection systems.

Respiratory Protection: Wear an N95 or higher particulate respirator if airborne concentrations exceed exposure limits. For high concentrations, use a full-face powered air-purifying respirator (PAPR) or SCBA.

Hand Protection: Wear nitrile or neoprene gloves.

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Eye Protection: Wear chemical safety goggles with side shields.

Skin and Body Protection: Wear antistatic work clothing. Note that PEO solutions create slippery surfaces; use slip-resistant footwear when handling wet areas.

9. Physical and chemical properties

Property	Value
Appearance	White to off-white, free-flowing powder
Odor	Odorless or slight characteristic odor
Particle Size	≤ 1000 μm (60-80 mesh typical)
Density	~ 1.13 g/cm ³
Bulk Density	~ 0.35 – 0.55 g/cm ³
Molecular Weight (Mv)	150,000 – 10,000,000+ (grade dependent)
Softening Point	65 – 67°C
Melting Point (Tm)	~ 65°C
Glass Transition Temperature (Tg)	~ -67°C
Flash Point	> 200°C
Auto-ignition Temperature	> 350°C
Solubility in Water	Fully soluble (forms viscous solutions)
Solubility in Organic Solvents	Soluble in chloroform, dichloroethane; insoluble in ether, hexane, aliphatic hydrocarbons
pH (1% solution)	6 – 8 (neutral)

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Volatile Organic Compounds (VOC)	< 0.1%
Water Absorption	Hygroscopic (absorbs moisture from air)
10. Stability and reactivity	
Property	Information
Reactivity	Stable under normal handling conditions.
Chemical stability	Stable under recommended storage conditions. Long-term exposure to air may cause oxidation and yellowing.
Possibility of hazardous reactions	None under normal use. Avoid contact with strong oxidizing agents.
Conditions to avoid	High temperatures (> 200°C), sparks, open flames, dust cloud formation, moisture (hygroscopic), prolonged air exposure.
Incompatible materials	Strong oxidizing agents, strong acids, and strong bases (may cause hydrolysis at high temperatures).
Hazardous decomposition products	Thermal decomposition (> 200°C) may release: carbon monoxide (CO), formaldehyde, acetaldehyde, and other hydrocarbons.
11. Toxicological information	
Property	Information
Acute Toxicity	Expected to be low. LD50 > 5,000 mg/kg (based on similar polyethylene glycol polymers).
Skin Corrosion/Irritation	Not classified. May cause mechanical irritation.
Serious Eye Damage/Irritation	May cause mechanical irritation (H320).
Respiratory or Skin Sensitization	Not classified. Dust may cause respiratory irritation.
Germ Cell Mutagenicity	Not classified.

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Carcinogenicity	IARC: Not classified. PEO is not known to be carcinogenic.
STOT – Single Exposure	May cause respiratory irritation (H335).
STOT – Repeated Exposure	Causes damage to lungs through prolonged or repeated inhalation of dust (H372). Prolonged overexposure may cause pneumoconiosis.
Aspiration Hazard	Not classified.
Ecotoxicity	Low acute toxicity; high concentration solutions may increase BOD in water.
12. Ecological information	
Property	Information
Toxicity	Low acute toxicity to aquatic life. Fine particles may cause physical harm. High concentrations may deplete oxygen due to BOD.
Persistence and Degradability	PEO is biodegradable in appropriate environmental conditions (e.g., activated sludge, compost).
Bioaccumulative potential	Not expected to bioaccumulate.
Mobility in soil	High mobility in wet conditions (water-soluble).
Other adverse effects	Avoid direct release into the environment. Dissolved PEO increases solution viscosity and may affect water bodies.
13. Disposal considerations	
13.1. Waste treatment methods	
Dispose of in accordance with all local, state, federal, and international environmental regulations. PEO is water-soluble and biodegradable; disposal to wastewater treatment facilities may be acceptable for small quantities. Large quantities should be incinerated in a permitted facility. Do not allow dust to enter drains or watercourses.	
14. Transport information	

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Regulation	Information
UN Number	Not regulated (most PEO powders are not classified as dangerous goods)
Proper Shipping Name	Not regulated
Transport hazard class	Not applicable
Packing group	Not applicable
Marine pollutant	No
Special precautions	Avoid dust formation during transport. Ensure secure stowage.
<p>Note: If the powder is extremely fine (< 100 mesh) and forms combustible dust clouds, consult a dangerous goods professional for potential classification as UN1325.</p>	
15. Regulatory information	
Regulation	Status
TSCA (USA)	Listed
EINECS (EU)	Listed
IECSC (China)	Listed
ENCS (Japan)	Listed
KECI (Korea)	Listed
AICS (Australia)	Listed
RoHS (EU)	Compliant
REACH (EU)	Compliant (SVHC < 0.1%)

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California Proposition 65	Not known to contain any Prop 65 listed chemicals above safe harbor levels (in supplied form)
FDA (Food Contact)	Select grades compliant (dependent on molecular weight and application)
Pharmaceutical Use	Biocompatible; used in controlled drug delivery systems
16. Other information	
Key/Legend:	
H320: Causes eye irritation.	
H335: May cause respiratory irritation.	
H372: Causes damage to organs (lungs) through prolonged or repeated exposure (inhalation).	
<p>Processing Note: PEO is a thermoplastic material that softens at 65-67°C and can be processed by extrusion, compression molding, and hot pressing. Processing temperatures should not exceed 200°C to prevent decomposition. For dissolution, add powder slowly to cold or room temperature water with vigorous stirring; hot water may cause clumping. High molecular weight grades require longer dissolution time.</p>	
<p>Storage Note: PEO is hygroscopic. Store in sealed original packaging in a cool, dry place below 40°C. Protect from humidity and prolonged air exposure to prevent oxidation and yellowing. Shelf life is typically 12-24 months when properly stored.</p>	
<p>Training Advice: Personnel handling PEO powder should be trained in combustible dust hazards, proper use of personal protective equipment (PPE), and emergency procedures. Note that spilled PEO creates slippery surfaces when wet; ensure proper housekeeping.</p>	
Disclaimer:	

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The information provided in this Safety Data Sheet is based on our current knowledge and is believed to be accurate as of the revision date. This SDS applies to PEO powder products supplied by PolymerVerse. It does not constitute a warranty or specification, nor does it replace product-specific SDS for modified or custom grades. Users should conduct their own testing to determine suitability for their specific applications. Processing recommendations are general guidelines; actual conditions may vary based on equipment and formulation. The company shall not be held liable for any damages resulting from handling or from contact with the above product. It is the user's responsibility to comply with all applicable health, safety, and environmental laws and regulations.

SDS Revision Date: 15-Apr-2026

Prepared by: PolymerVerse

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End of Safety Data Sheet

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