US - OSHA SAFETY DATA SHEET

Issue Date 05-Jun-2018 **Revision Date** Not applicable. **Version** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name Perfringolysin O from *Clostridium perfringens* with N-terminal Histidine Tag, Recombinant from *Escherichia coli*.

Product Code NR-10357

Other means of identification

UN/ID No. UN3172

Synonyms *Bacillus aerogenes capsulatus*, *Clostridium welchii*, *C. perfringens*, Theta toxin, Theta hemolysin, Thiol-activated cytolysin.

Recommended use of the chemical and restrictions on use

Recommended Use Material is authorized for research, non-commercial purposes only.

Uses Advised Against Not available.

Details of the supplier of the safety data sheet

Supplier Address

BEI Resources
10801 University Blvd.,
Manassas, VA,
USA, 20110-2204

Emergency telephone number

Company Phone Number (800) 359-7370/ (703) 365-2727

24 Hour Emergency Phone Number Chemtrec (US): 1-800-424-9300.
Domestic: (703) 365-2710.
International: +1(703)-527-3887.

2. HAZARDS IDENTIFICATION

Classification

Health Hazards

Acute Toxicity - Oral	Category 3

Physical Hazards

Not classified.

OSHA Regulatory Status

This product is considered hazardous by the 2012 OSHA Hazard Communication Standard/Globally Harmonized System of Classification and Labelling of Chemicals (GHS); (29 CFR 1910.1200; Revision 3).

Label elements

Emergency Overview

Danger

Hazard Statements
Toxic if swallowed.

Normal precautions common to safe manufacturing practice should be followed in handling and storage.

Appearance Clear liquid. **Physical State** Liquid. **Odor** Not available.

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling.
Do not eat, drink, or smoke when using this product.

Precautionary Statements - Response
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Specific treatment (see Product Sheet and seek Medical Treatment immediately).
Rinse mouth.

Precautionary Statements - Storage
Store locked up.

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal facility.

Hazards not otherwise classified (HNOC)
Biosafety Level 2

Other information
Not available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200; Revision 3).

Common name Perfringolysin O (PFO) from *Clostridium perfringens*, His-tagged recombinant from *Escherichia coli*.
Synonyms *Bacillus aerogenes capsulatus*, *Clostridium welchii*, *C. perfringens*, Theta toxin, Theta hemolysin, Thiol-activated cytolysin.
Chemical Family Recombinant protein.
Chemical nature Bacterial toxin.

Chemical Name	CAS No.	Weight-%
Perfringolysin O	71329-60-7	0.34
HEPES	7365-45-9	8.11
Glycerol	56-81-5	85.06

Sodium chloride	7647-14-5	5.97
Dithiothreitol (DTT)	3483-12-3	0.52

4. FIRST AID MEASURES

First aid measures

Eye Contact Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for a duration of 15-20 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. If eye irritation persists: Get medical advice/attention.

Skin Contact Take off immediately all contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Wash with plenty of lukewarm, gently flowing water for a duration of 15-20 minutes or until medical aid is available. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before re-use or discard. If skin irritation occurs: Get medical advice/attention.

Inhalation Remove source of exposure or move person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER/doctor. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by the POISON CENTER/doctor. Immediately call a POISON CENTER/doctor.

Ingestion Rinse mouth. Immediately call a POISON CENTER/doctor. If breathing has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Treatment of fluid and electrolyte loss is usually achieved through oral rehydration.

Most important symptoms and effects, both acute and delayed

Symptoms Not available.

Indication of any immediate medical attention and special treatment needed

Note to Physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media None known.

Specific hazards arising from the chemical
Not available.

Hazardous Combustion Products Not available.

Explosion data
Sensitivity to Mechanical Impact None known.
Sensitivity to Static Discharge None known.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Wear appropriate personal protective equipment (see Section 8). Keep unnecessary personnel away. Ensure adequate ventilation, especially in confined areas.

Environmental precautions

Environmental Precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Patient/Victim: Wash with soap and water. Work clothes should be laundered separately. Launder contaminated clothing before re-use. Do not take clothing home. Equipment/Environment: Allow aerosols to settle; wearing protective clothing, gently cover spill with paper towel and apply 1% sodium hypochlorite, starting at perimeter and working towards the center; allow sufficient contact time before clean-up (30 min).

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on Safe Handling Use aseptic procedures. Decontamination of work surfaces daily, after finishing work and following spills (Solutions of sodium hypochlorite 0.1% or sodium hydroxide 0.1 N readily inactivate the toxin). Standard microbiological practices should be followed. Do not get in eyes, on skin or on clothing. Do not breathe vapors or mist. Use good personal hygiene practices. Eating, drinking and smoking in work areas is prohibited. Remove contaminated clothing and protective equipment before entering eating areas. Eyewash stations and showers should be available in areas where this material is used and stored. Access to the laboratory is restricted when work is being conducted. A biohazard sign with relevant information should be posted at the entrance. "Toxins in Use - Authorized Personnel Only" should be clearly posted. Frequent and careful hand-washing and laboratory decontamination should be strictly enforced. Ventilation Requirements: Use only with adequate ventilation to control air contaminants to their exposure limits. Required HEPA-filtered vacuum lines.

Conditions for safe storage, including any incompatibilities

Storage Conditions All containers must be properly labelled. Store in approved containers and protect against physical damage. Keep containers securely sealed when not in use. Containers that have been opened must be carefully resealed to prevent leakage. Empty containers retain residue and may be dangerous. The product is provided frozen and should be stored at -80ºC immediately upon arrival.

Packaging materials Packed aseptically in polypropylene cryovials.

Incompatible materials Not available.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, contains the following hazardous materials with occupational exposure limits established by the region-specific regulatory bodies.

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Glycerol 56-81-5	-	TWA: 15 mg/m^3 mist, total particulate TWA: 5 mg/m^3 mist, respirable fraction	-

		(vacated) TWA: 10 mg/m^3 mist, total particulate (vacated) TWA: 5 mg/m^3 mist, respirable fraction	

Appropriate engineering controls

Engineering Controls The health hazard risks of handling this material are dependent on factors, such as physical form and quantity. Site-specific risk assessments should be conducted to determine the appropriate exposure control measures. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels as low as reasonably achievable.

Individual protection measures, such as personal protective equipment

Eye/Face Protection In laboratory, medical or industrial settings, safety glasses with side shields are highly recommended. The use of goggles or full face protection may be required depending on the industrial exposure setting. Contact a health and safety professional for specific information.

Skin and Body Protection In laboratory, medical or industrial settings, gloves and lab coats are recommended. The use of additional personal protective equipment such as shoe coverings, gauntlets, hoods or head coverings may be necessary. Contact a health and safety professional for specific information.

Respiratory Protection Respirators may be required for certain laboratory and manufacturing tasks if engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (where the exposure limits have not been established). Workplace risk assessments should be completed before specifying and implementing respirator usage. All respirators must conform to specifications for efficiency and performance indicated by OSHA Standard 29 CFR 1910.134.

General Hygiene Considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid.		
Appearance	Clear liquid.	**Odor**	Not available.
Color	Colorless.	**Odor Threshold**	Not available.

Property	**Values**	**Remarks**
pH	Not available.	
Melting Point/Freezing Point	Not available.	
Boiling Point/Boiling Range	Not available.	
Flash Point	Not available.	
Evaporation Rate	Not available.	
Flammability (solid, gas)	Not available.	
Flammability Limit in Air		
Upper Flammability Limit:	Not available.	
Lower Flammability Limit:	Not available.	
Vapor Pressure	Not available.	
Vapor Density	Not available.	
Specific Gravity	Not available.	
Water Solubility	Not available.	
Solubility in Other Solvents	Not available.	

Partition Coefficient	Not available.
Autoignition Temperature	Not available.
Decomposition Temperature	Not available.
Kinematic Viscosity	Not available.
Dynamic Viscosity	Not available.
Explosive Properties	Not available.
Oxidizing Properties	Not available.

Other information

Softening Point	Not available.
Molecular Weight	55 kDa
VOC Content (%)	Not available.
Density	Not available.
Bulk Density	Not available.

10. STABILITY AND REACTIVITY

Reactivity
Not available.

Chemical stability
Stable under normal conditions.

Possibility of hazardous reactions
Not available.

Conditions to avoid
Keep away from heat and ignition sources.

Incompatible materials
Not available.

Hazardous decomposition products
Not available.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute Toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50	Intravenous LD50
Perfringolysin O 71329-60-7	-	-	-	13-16 µg/m^3 (Mouse)
HEPES 7365-45-9	> 2000 mg/kg (Rat)	-	-	-
Glycerol 56-81-5	= 12600 mg/kg (Rat)	> 10 g/kg (Rabbit)	> 570 mg/m^3 (Rat) 1 h	-

Information on toxicological effects

Symptoms Not available.

Delayed and immediate effects as well as chronic effects from short- and long-term exposure

Skin Corrosion/Irritation No data available.

Serious Eye Damage/Eye Irritation No data available.

Sensitization No data available.

Germ Cell Mutagenicity No data available.

Carcinogenicity No data available.

Reproductive Toxicity No data available.

STOT - Single Exposure Not classified.

STOT - Repeated Exposure Not classified.

Aspiration Hazard Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Glycerol 56-81-5		51 - 57: 96 h Oncorhynchus mykiss mL/L LC50 static		500: 24 h Daphnia magna mg/L EC50

Persistence and degradability
No data available.

Bioaccumulation
No data available.

Mobility

Chemical Name	Partition Coefficient
Glycerol 56-81-5	-1.76

Other adverse effects
No data available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of Wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Disposal should be in accordance with applicable regional, national and local laws and regulations. Do not reuse container.

U.S. EPA Waste Number Not available.

California Hazardous Waste Codes Not available.

This product does not contain substances that are listed with the State of California as hazardous waste.

14. TRANSPORT INFORMATION

DOT Regulated.
UN/ID No. UN3172
Proper shipping name Toxins, extracted from living sources, liquid, n.o.s. (Perfringolysin O from *Clostridium perfringens* with N-terminal Histidine Tag, Recombinant from *Escherichia coli*.).

Hazard Class	Class 6.1
Packing Group	I

IATA	Regulated.
UN/ID No.	UN3172
Proper shipping name	Toxins, extracted from living sources, liquid, n.o.s. (Perfringolysin O from *Clostridium perfringens* with N-terminal Histidine Tag, Recombinant from *Escherichia coli*.).
Hazard Class	Class 6.1
Packing Group	I

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

U.S. State Regulations

California Proposition 65
No component is on the Prop 65 list.

U.S. State Right-to-Know Regulations
This product contains the following substances regulated by state right-to-know regulations.

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Glycerol 56-81-5	X	X	X

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable.

16. OTHER INFORMATION

Prepared By	IES Engineers
Issue Date	05-Jun-2018
Revision Date	Not applicable.
Revision Note	New SDS.

Disclaimer
BEI Resources considers that the information contained in this Safety Data Sheet is accurate, and while it is provided in good faith, it is without warranty of any kind, expressed or implied. The information contained herein is designated only as guidance for safe handling, storage and use of the substance and is not a specification nor does it guarantee any

specific properties. Only competent personnel, within a controlled environment should handle all chemicals. BEI Resources is not to be held liable for any loss, injury or damage from contact with the product.

End of Safety Data Sheet