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
BTX-100

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
ATCC
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
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.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical State</th>
<th>Odor</th>
</tr>
</thead>
</table>

**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 cytolytin.

**Chemical Family**
Recombinant protein.

**Chemical nature**
Bacterial toxin.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfringolysin O</td>
<td>71329-60-7</td>
<td>0.34</td>
</tr>
<tr>
<td>HEPES</td>
<td>7365-45-9</td>
<td>8.11</td>
</tr>
<tr>
<td>Glycerol</td>
<td>56-81-5</td>
<td>85.06</td>
</tr>
</tbody>
</table>
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 ~80°C 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.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol 56-81-5</td>
<td>-</td>
<td>TWA: 15 mg/m³ mist, total particulate</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 5 mg/m³ mist, respirable fraction</td>
<td></td>
</tr>
</tbody>
</table>
(vacated) TWA: 10 mg/m³ mist, total particulate
(vacated) TWA: 5 mg/m³ 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid.</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear liquid.</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Colorless.</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Melting Point/Freezing Point</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Boiling Point/Boiling Range</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Flammability Limit:</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Lower Flammability Limit:</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Solubility in Other Solvents</td>
<td>Not available.</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
<th>Intravenous LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfringolysin O 71329-60-7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13-16 µg/m³ (Mouse)</td>
</tr>
<tr>
<td>HEPES 7365-45-9</td>
<td>&gt; 2000 mg/kg (Rat)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Glycerol 56-81-5</td>
<td>≥ 12600 mg/kg (Rat)</td>
<td>&gt; 10 g/kg (Rabbit)</td>
<td>&gt; 570 mg/m³ (Rat) 1 h</td>
<td>-</td>
</tr>
</tbody>
</table>

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

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

Persistence and degradability  
No data available.

Bioaccumulation  
No data available.

Mobility

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Partition Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol 56-81-5</td>
<td>-1.76</td>
</tr>
</tbody>
</table>

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).

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.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>56-81-5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
ATCC 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