



## Section 2. Hazards identification

<b>Hazard statements</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	H320 - Causes eye irritation. H319 - Causes serious eye irritation. H412 - Harmful to aquatic life with long lasting effects.
<b>Precautionary statements</b>		
<b>Prevention</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. P280 - Wear eye or face protection. P273 - Avoid release to the environment.
<b>Response</b>	: Pfu DNA Ligase  Pfu DNA Ligase 10X Buffer	P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical advice or attention. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical advice or attention.
<b>Storage</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
<b>Disposal</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Supplemental label elements</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	None known. None known.
<b>2.3 Other hazards</b>		
<b>Hazards not otherwise classified</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	None known. None known.

## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Mixture Mixture
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Ingredient name	%	CAS number
<b>Pfu DNA Ligase</b>		
Glycerol	≥50 - ≤75	56-81-5
Polyoxyethylene octyl phenyl ether	<0.25	9002-93-1
<b>Pfu DNA Ligase 10X Buffer</b>		
Potassium chloride	≤3	7447-40-7
Polyoxyethylene octyl phenyl ether	<2.5	9002-93-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.**

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### 4.1 Description of necessary first aid measures

<b>Eye contact</b>	: Pfu DNA Ligase	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.
	Pfu DNA Ligase 10X Buffer	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
<b>Inhalation</b>	: Pfu DNA Ligase	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
	Pfu DNA Ligase 10X Buffer	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>Skin contact</b>	: Pfu DNA Ligase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
	Pfu DNA Ligase 10X Buffer	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Ingestion</b>	: Pfu DNA Ligase	Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by

## Section 4. First aid measures

Pfu DNA Ligase 10X Buffer

mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### 4.2 Most important symptoms/effects, acute and delayed

#### Potential acute health effects

<b>Eye contact</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Causes eye irritation. Causes serious eye irritation.
<b>Inhalation</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Skin contact</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Ingestion</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

#### Over-exposure signs/symptoms

<b>Eye contact</b>	: Pfu DNA Ligase  Pfu DNA Ligase 10X Buffer	Adverse symptoms may include the following: irritation watering redness Adverse symptoms may include the following: pain or irritation watering redness
<b>Inhalation</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.
<b>Skin contact</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.
<b>Ingestion</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

<b>Notes to physician</b>	: Pfu DNA Ligase  Pfu DNA Ligase 10X Buffer	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>Specific treatments</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific treatment. No specific treatment.

## Section 4. First aid measures

<b>Protection of first-aiders</b>	: Pfu DNA Ligase	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
	Pfu DNA Ligase 10X Buffer	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: Pfu DNA Ligase	Use an extinguishing agent suitable for the surrounding fire.
	Pfu DNA Ligase 10X Buffer	Use an extinguishing agent suitable for the surrounding fire.
<b>Unsuitable extinguishing media</b>	: Pfu DNA Ligase	None known.
	Pfu DNA Ligase 10X Buffer	None known.

### 5.2 Special hazards arising from the substance or mixture

<b>Specific hazards arising from the chemical</b>	: Pfu DNA Ligase	In a fire or if heated, a pressure increase will occur and the container may burst.
	Pfu DNA Ligase 10X Buffer	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
<b>Hazardous thermal decomposition products</b>	: Pfu DNA Ligase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	Pfu DNA Ligase 10X Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds metal oxide/oxides

### 5.3 Advice for firefighters

<b>Special protective actions for fire-fighters</b>	: Pfu DNA Ligase	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
	Pfu DNA Ligase 10X Buffer	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

## Section 5. Fire-fighting measures

<b>Special protective equipment for fire-fighters</b>	: Pfu DNA Ligase	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	Pfu DNA Ligase 10X Buffer	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

<b>For non-emergency personnel</b>	: Pfu DNA Ligase	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	Pfu DNA Ligase 10X Buffer	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
<b>For emergency responders</b>	: Pfu DNA Ligase	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
	Pfu DNA Ligase 10X Buffer	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

<b>6.2 Environmental precautions</b>	: Pfu DNA Ligase	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
	Pfu DNA Ligase 10X Buffer	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

### 6.3 Methods and materials for containment and cleaning up

## Section 6. Accidental release measures

**Methods for cleaning up** : Pfu DNA Ligase

Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Pfu DNA Ligase 10X Buffer

Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

### 7.1 Precautions for safe handling

**Protective measures** : Pfu DNA Ligase

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Pfu DNA Ligase 10X Buffer

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene** : Pfu DNA Ligase

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Pfu DNA Ligase 10X Buffer

**7.2 Conditions for safe storage, including any incompatibilities** : Pfu DNA Ligase

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

## Section 7. Handling and storage

Pfu DNA Ligase 10X Buffer

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

### 7.3 Specific end use(s)

<b>Recommendations</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Industrial applications, Professional applications. Industrial applications, Professional applications.
<b>Industrial sector specific solutions</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.

## Section 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
Pfu DNA Ligase	<b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 10 mg/m <sup>3</sup> 8 hours. Form: Total dust <b>OSHA PEL (United States, 5/2018).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 15 mg/m <sup>3</sup> 8 hours. Form: Total dust
Glycerol	
Polyoxyethylene octyl phenyl ether	None.
<b>Pfu DNA Ligase 10X Buffer</b>	
Potassium chloride	None.
Polyoxyethylene octyl phenyl ether	None.

### Biological exposure indices

No exposure indices known.

### 8.2 Exposure controls

<b>Appropriate engineering controls</b>	: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
<b>Environmental exposure controls</b>	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures



## Section 8. Exposure controls/personal protection

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

### Appearance

<b>Physical state</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Liquid. Liquid.
<b>Color</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
<b>Odor</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
<b>Odor threshold</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
<b>pH</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	7.5 7.5
<b>Melting point/freezing point</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
<b>Boiling point, initial boiling point, and boiling range</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
<b>Flash point</b>	:	

## Section 9. Physical and chemical properties and safety characteristics

Ingredient name	Closed cup			Open cup		
	°C	°F	Method	°C	°F	Method
<b>Pfu DNA Ligase</b> Glycerol				177	350.6	
<b>Pfu DNA Ligase 10X Buffer</b> Polyoxyethylene octyl phenyl ether	251	483.8				

**Evaporation rate** : Pfu DNA Ligase Not available.

Pfu DNA Ligase 10X Buffer Not available.

**Flammability** : Pfu DNA Ligase Not applicable.

Pfu DNA Ligase 10X Buffer Not applicable.

**Lower and upper explosion limit/flammability limit** : Pfu DNA Ligase Not available.

Pfu DNA Ligase 10X Buffer Not available.

**Vapor pressure** :

Ingredient name	Vapor Pressure at 20°C			Vapor pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
<b>Pfu DNA Ligase</b> water	23.8	3.2		92.258	12.3	
Glycerol	0.000075	0.00001		0.0025	0.00033	
<b>Pfu DNA Ligase 10X Buffer</b> water	23.8	3.2		92.258	12.3	
Polyoxyethylene octyl phenyl ether	0.997581	0.13				

**Relative vapor density** : Pfu DNA Ligase Not available.

Pfu DNA Ligase 10X Buffer Not available.

**Relative density** : Pfu DNA Ligase Not available.

Pfu DNA Ligase 10X Buffer Not available.

**Solubility(ies)** :

Media	Result
<b>Pfu DNA Ligase</b> water	Soluble
<b>Pfu DNA Ligase 10X Buffer</b> water	Soluble

**Partition coefficient: n-octanol/water** : Pfu DNA Ligase Not applicable.

Pfu DNA Ligase 10X Buffer Not applicable.

**Auto-ignition temperature** :

Ingredient name	°C	°F	Method
<b>Pfu DNA Ligase</b> Glycerol	370	698	

**Decomposition temperature** : Pfu DNA Ligase Not available.

Pfu DNA Ligase 10X Buffer Not available.

## Section 9. Physical and chemical properties and safety characteristics

**Viscosity** : Pfu DNA Ligase Not available.  
Pfu DNA Ligase 10X Buffer Not available.

### Particle characteristics

**Median particle size** : Pfu DNA Ligase Not applicable.  
Pfu DNA Ligase 10X Buffer Not applicable.

## Section 10. Stability and reactivity

**10.1 Reactivity** : Pfu DNA Ligase No specific test data related to reactivity available for this product or its ingredients.  
Pfu DNA Ligase 10X Buffer No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : Pfu DNA Ligase The product is stable.  
Pfu DNA Ligase 10X Buffer The product is stable.

**10.3 Possibility of hazardous reactions** : Pfu DNA Ligase Under normal conditions of storage and use, hazardous reactions will not occur.  
Pfu DNA Ligase 10X Buffer Under normal conditions of storage and use, hazardous reactions will not occur.

**10.4 Conditions to avoid** : Pfu DNA Ligase No specific data.  
Pfu DNA Ligase 10X Buffer No specific data.

**10.5 Incompatible materials** : Pfu DNA Ligase May react or be incompatible with oxidizing materials.  
Pfu DNA Ligase 10X Buffer May react or be incompatible with oxidizing materials.

**10.6 Hazardous decomposition products** : Pfu DNA Ligase Under normal conditions of storage and use, hazardous decomposition products should not be produced.  
Pfu DNA Ligase 10X Buffer Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
<b>Pfu DNA Ligase</b>				
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-
<b>Pfu DNA Ligase 10X Buffer</b>				
Potassium chloride	LD50 Oral	Rat	2600 mg/kg	-
Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-

#### Irritation/Corrosion

## Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
Pfu DNA Ligase Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
Polyoxyethylene octyl phenyl ether	Skin - Mild irritant	Rabbit	-	24 hours 500 uL	-
Pfu DNA Ligase 10X Buffer Potassium chloride	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 uL	-

### Sensitization

Not available.

### Mutagenicity

**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Specific target organ toxicity (single exposure)

Not available.

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

### Information on the likely routes of exposure

: Pfu DNA Ligase  
Pfu DNA Ligase 10X Buffer

Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

### Potential acute health effects

#### Eye contact

: Pfu DNA Ligase  
Pfu DNA Ligase 10X Buffer

Causes eye irritation.  
Causes serious eye irritation.

#### Inhalation

: Pfu DNA Ligase  
Pfu DNA Ligase 10X Buffer

No known significant effects or critical hazards.  
No known significant effects or critical hazards.

#### Skin contact

: Pfu DNA Ligase  
Pfu DNA Ligase 10X Buffer

No known significant effects or critical hazards.  
No known significant effects or critical hazards.

#### Ingestion

: Pfu DNA Ligase  
Pfu DNA Ligase 10X Buffer

No known significant effects or critical hazards.  
No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

## Section 11. Toxicological information

<b>Eye contact</b>	: Pfu DNA Ligase	Adverse symptoms may include the following: irritation watering redness
	: Pfu DNA Ligase 10X Buffer	Adverse symptoms may include the following: pain or irritation watering redness
<b>Inhalation</b>	: Pfu DNA Ligase	No specific data.
	: Pfu DNA Ligase 10X Buffer	No specific data.
<b>Skin contact</b>	: Pfu DNA Ligase	No specific data.
	: Pfu DNA Ligase 10X Buffer	No specific data.
<b>Ingestion</b>	: Pfu DNA Ligase	No specific data.
	: Pfu DNA Ligase 10X Buffer	No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Potential chronic health effects

<b>General</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Mutagenicity</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Reproductive toxicity</b>	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
<b>Pfu DNA Ligase</b>					
Glycerol	12600	N/A	N/A	N/A	N/A
Polyoxyethylene octyl phenyl ether	1800	N/A	N/A	N/A	N/A
<b>Pfu DNA Ligase 10X Buffer</b>					
Pfu DNA Ligase 10X Buffer	89087.8	N/A	N/A	N/A	N/A
Potassium chloride	2600	N/A	N/A	N/A	N/A
Polyoxyethylene octyl phenyl ether	1800	N/A	N/A	N/A	N/A

## Section 11. Toxicological information

<b>Other information</b>	: Pfu DNA Ligase  Pfu DNA Ligase 10X Buffer	Adverse symptoms may include the following: May cause skin sensitization. Adverse symptoms may include the following: May cause skin sensitization.
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## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<b>Pfu DNA Ligase</b>			
Glycerol	Acute LC50 54000 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Polyoxyethylene octyl phenyl ether	Acute LC50 5.85 mg/l Fresh water	Crustaceans - Ceriodaphnia rigaudi - Neonate	48 hours
	Acute LC50 11.2 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4500 µg/l Fresh water	Fish - Pimephales promelas	96 hours
<b>Pfu DNA Ligase 10X Buffer</b>			
Potassium chloride	Acute EC50 9.24 g/L Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute EC50 1337000 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 83000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 9.68 mg/l Fresh water	Crustaceans - Pseudosida ramosa - Neonate	48 hours
	Acute LC50 509.65 mg/l Fresh water	Fish - Danio rerio	96 hours
Polyoxyethylene octyl phenyl ether	Acute LC50 5.85 mg/l Fresh water	Crustaceans - Ceriodaphnia rigaudi - Neonate	48 hours
	Acute LC50 11.2 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4500 µg/l Fresh water	Fish - Pimephales promelas	96 hours

### 12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
<b>Pfu DNA Ligase</b>				
Glycerol	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
<b>Pfu DNA Ligase</b>			
Polyoxyethylene octyl phenyl ether	-	-	Readily
<b>Pfu DNA Ligase 10X Buffer</b>			
Potassium chloride	-	-	Readily
Polyoxyethylene octyl phenyl ether	-	-	Readily

### 12.3 Bioaccumulative potential

## Section 12. Ecological information

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>Pfu DNA Ligase</b>			
Glycerol	-1.76	-	low
Polyoxyethylene octyl phenyl ether	4.86	-	high
<b>Pfu DNA Ligase 10X Buffer</b>			
Potassium chloride	-0.46	-	low
Polyoxyethylene octyl phenyl ether	4.86	-	high

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**12.5 Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

### 13.1 Waste treatment methods

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## Section 14. Transport information

**DOT / TDG / Mexico / IMDG / IATA** : Not regulated.

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to IMO instruments** : Not available.

## Section 15. Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**U.S. Federal regulations** : **TSCA 8(a) PAIR**: Polyoxyethylene octyl phenyl ether  
**TSCA 8(a) CDR Exempt/Partial exemption**: Not determined  
**Clean Water Act (CWA) 311**: Edetic acid

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

#### SARA 302/304

##### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

#### SARA 311/312

**Classification** : Pfu DNA Ligase EYE IRRITATION - Category 2B  
Pfu DNA Ligase 10X Buffer EYE IRRITATION - Category 2A

##### Composition/information on ingredients

Name	%	Classification
<b>Pfu DNA Ligase</b> Glycerol	≥50 - ≤75	EYE IRRITATION - Category 2B
<b>Pfu DNA Ligase 10X Buffer</b> Potassium chloride Polyoxyethylene octyl phenyl ether	≤3 <2.5	EYE IRRITATION - Category 2B ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1

### State regulations

**Massachusetts** : The following components are listed: GLYCERINE MIST

**New York** : None of the components are listed.

**New Jersey** : The following components are listed: GLYCERIN

**Pennsylvania** : The following components are listed: 1,2,3-PROPANETRIOL

#### California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.



## Section 15. Regulatory information

### [Rotterdam Convention on Prior Informed Consent \(PIC\)](#)

Not listed.

### [UNECE Aarhus Protocol on POPs and Heavy Metals](#)

Not listed.

### [Inventory list](#)

<b>Australia</b>	: Not determined.
<b>Canada</b>	: Not determined.
<b>China</b>	: All components are listed or exempted.
<b>Eurasian Economic Union</b>	: <b>Russian Federation inventory</b> : Not determined.
<b>Japan</b>	: <b>Japan inventory (CSCL)</b> : Not determined. <b>Japan inventory (ISHL)</b> : Not determined.
<b>New Zealand</b>	: Not determined.
<b>Philippines</b>	: Not determined.
<b>Republic of Korea</b>	: Not determined.
<b>Taiwan</b>	: All components are listed or exempted.
<b>Thailand</b>	: Not determined.
<b>Turkey</b>	: Not determined.
<b>United States</b>	: All components are active or exempted.
<b>Viet Nam</b>	: Not determined.

## Section 16. Other information

### [Procedure used to derive the classification](#)

Classification	Justification
<b>Pfu DNA Ligase</b> EYE IRRITATION - Category 2B	Calculation method
<b>Pfu DNA Ligase 10X Buffer</b> EYE IRRITATION - Category 2A AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method Calculation method

### [History](#)

<b>Date of issue</b>	: 11/29/2022
<b>Date of previous issue</b>	: 04/22/2020
<b>Version</b>	: 7

### [Key to abbreviations](#)

: ATE = Acute Toxicity Estimate
: BCF = Bioconcentration Factor
: GHS = Globally Harmonized System of Classification and Labelling of Chemicals
: IATA = International Air Transport Association
: IBC = Intermediate Bulk Container
: IMDG = International Maritime Dangerous Goods
: LogPow = logarithm of the octanol/water partition coefficient
: MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
: N/A = Not available
: UN = United Nations

Indicates information that has changed from previously issued version.

### [Notice to reader](#)

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