Conforms to US OSHA Hazard Communication 29CFR1910.1200

# SAFETY DATA SHEET

PfuUltra High-Fidelity DNA Polymerase, Part Number 600382

## Section 1. Identification

### 1.1 Product identifier

**Product name** : PfuUltra High-Fidelity DNA Polymerase, Part Number 600382

**Part no. (chemical kit)** : 600382

**Part no.** : PfuUltra HF DNA Polymerase 600380-51
10X PfuUltra HF Reaction Buffer 600380-52

**Validation date** : 9/25/2019

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

**Material uses** : Analytical reagent.

PfuUltra HF DNA Polymerase 0.2 ml (100 U 2.5 U/µl)
10X PfuUltra HF Reaction Buffer 2 x 1 ml

### 1.3 Details of the supplier of the safety data sheet

**Supplier/Manufacturer** : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

### 1.4 Emergency telephone number

**In case of emergency** : CHEMTREC®: 1-800-424-9300

## Section 2. Hazards identification

### 2.1 Classification of the substance or mixture

**OSHA/HCS status** : PfuUltra HF DNA Polymerase: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
10X PfuUltra HF Reaction Buffer: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

### Classification of the substance or mixture

**PfuUltra HF DNA Polymerase**
H320 EYE IRRITATION - Category 2B

**10X PfuUltra HF Reaction Buffer**
H319 EYE IRRITATION - Category 2A

**Ingredients of unknown toxicity** :

PfuUltra HF DNA Polymerase: Percentage of the mixture consisting of ingredient (s) of unknown acute inhalation toxicity: 30 - 60%

10X PfuUltra HF Reaction Buffer: Percentage of the mixture consisting of ingredient (s) of unknown acute dermal toxicity: 1 - 10%
Percentage of the mixture consisting of ingredient (s) of unknown acute inhalation toxicity: 1 - 10%
Percentage of the mixture consisting of ingredient (s) of unknown acute oral toxicity: 1 - 10%

10X PfuUltra HF Reaction Buffer: Percentage of the mixture consisting of ingredient (s) of unknown hazards to the aquatic environment: 3.2%

### 2.2 GHS label elements

# Section 2. Hazards identification

**Hazard pictograms** : 10X PfuUltra HF Reaction Buffer

| | | |
|---|---|---|
| **Signal word** | : PfuUltra HF DNA Polymerase | Warning |
| | 10X PfuUltra HF Reaction Buffer | Warning |
| **Hazard statements** | : PfuUltra HF DNA Polymerase | H320 - Causes eye irritation. |
| | 10X PfuUltra HF Reaction Buffer | H319 - Causes serious eye irritation. |
| **Precautionary statements** | | |
| **Prevention** | : PfuUltra HF DNA Polymerase | P264 - Wash hands thoroughly after handling. |
| | 10X PfuUltra HF Reaction Buffer | P280 - Wear eye or face protection.<br>P264 - Wash hands thoroughly after handling. |
| **Response** | : PfuUltra HF DNA Polymerase | P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>P337 + P313 - If eye irritation persists: Get medical attention. |
| | 10X PfuUltra HF Reaction 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.<br>P337 + P313 - If eye irritation persists: Get medical attention. |
| **Storage** | : PfuUltra HF DNA Polymerase | Not applicable. |
| | 10X PfuUltra HF Reaction Buffer | Not applicable. |
| **Disposal** | : PfuUltra HF DNA Polymerase | Not applicable. |
| | 10X PfuUltra HF Reaction Buffer | Not applicable. |
| **Supplemental label elements** | : PfuUltra HF DNA Polymerase | None known. |
| | 10X PfuUltra HF Reaction Buffer | None known. |
| **2.3 Other hazards** | | |
| **Hazards not otherwise classified** | : PfuUltra HF DNA Polymerase | None known. |
| | 10X PfuUltra HF Reaction Buffer | None known. |

# Section 3. Composition/information on ingredients

| | | |
|---|---|---|
| **Substance/mixture** | : PfuUltra HF DNA Polymerase | Mixture |
| | 10X PfuUltra HF Reaction Buffer | Mixture |

| Ingredient name | % | CAS number |
|---|---|---|
| **PfuUltra HF DNA Polymerase** | | |
| Glycerol | ≥50 - ≤75 | 56-81-5 |
| Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy- | <0.25 | 9036-19-5 |
| **10X PfuUltra HF Reaction Buffer** | | |
| 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride | ≤5 | 1185-53-1 |
| Polyoxyethylene octyl phenyl ether | ≤2.3 | 9002-93-1 |
| Ammonium sulphate | ≤0.3 | 7783-20-2 |

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 as hazardous to health or the environment and hence require reporting in this section.**

# Section 3. Composition/information on ingredients

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

# Section 4. First aid measures

## 4.1 Description of necessary first aid measures

| | | | |
|---|---|---|---|
| **Eye contact** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. |
| **Inhalation** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. |
| **Skin contact** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. |

# Section 4. First aid measures

| | | | |
|---|---|---|---|
| **Ingestion** | : | PfuUltra HF DNA Polymerase | Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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. |
| | | 10X PfuUltra HF Reaction Buffer | Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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

| | | | |
|---|---|---|---|
| **Eye contact** | : | PfuUltra HF DNA Polymerase | Causes eye irritation. |
| | | 10X PfuUltra HF Reaction Buffer | Causes serious eye irritation. |
| **Inhalation** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Skin contact** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Ingestion** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |

### Over-exposure signs/symptoms

| | | | |
|---|---|---|---|
| **Eye contact** | : | PfuUltra HF DNA Polymerase | Adverse symptoms may include the following:<br>irritation<br>watering<br>redness |
| | | 10X PfuUltra HF Reaction Buffer | Adverse symptoms may include the following:<br>pain or irritation<br>watering<br>redness |
| **Inhalation** | : | PfuUltra HF DNA Polymerase | No specific data. |
| | | 10X PfuUltra HF Reaction Buffer | No specific data. |
| **Skin contact** | : | PfuUltra HF DNA Polymerase | No specific data. |
| | | 10X PfuUltra HF Reaction Buffer | No specific data. |

# Section 4. First aid measures

| | | | |
|---|---|---|---|
| **Ingestion** | : | PfuUltra HF DNA Polymerase | No specific data. |
| | | 10X PfuUltra HF Reaction Buffer | No specific data. |

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

| | | | |
|---|---|---|---|
| **Notes to physician** | : | PfuUltra HF DNA Polymerase | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| | | 10X PfuUltra HF Reaction Buffer | 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. |
| **Specific treatments** | : | PfuUltra HF DNA Polymerase | No specific treatment. |
| | | 10X PfuUltra HF Reaction Buffer | No specific treatment. |
| **Protection of first-aiders** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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

| | | | |
|---|---|---|---|
| **Suitable extinguishing media** | : | PfuUltra HF DNA Polymerase | Use an extinguishing agent suitable for the surrounding fire. |
| | | 10X PfuUltra HF Reaction Buffer | Use an extinguishing agent suitable for the surrounding fire. |
| **Unsuitable extinguishing media** | : | PfuUltra HF DNA Polymerase | None known. |
| | | 10X PfuUltra HF Reaction Buffer | None known. |

## 5.2 Special hazards arising from the substance or mixture

| | | | |
|---|---|---|---|
| **Specific hazards arising from the chemical** | : | PfuUltra HF DNA Polymerase | In a fire or if heated, a pressure increase will occur and the container may burst. |
| | | 10X PfuUltra HF Reaction Buffer | In a fire or if heated, a pressure increase will occur and the container may burst. |
| **Hazardous thermal decomposition products** | : | PfuUltra HF DNA Polymerase | Decomposition products may include the following materials:<br>carbon dioxide<br>carbon monoxide |
| | | 10X PfuUltra HF Reaction Buffer | Decomposition products may include the following materials:<br>carbon dioxide<br>carbon monoxide<br>nitrogen oxides<br>halogenated compounds |

## 5.3 Advice for firefighters

# Section 5. Fire-fighting measures

| | | | |
|---|---|---|---|
| **Special protective actions for fire-fighters** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. |
| **Special protective equipment for fire-fighters** | : | PfuUltra HF DNA Polymerase | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
| | | 10X PfuUltra HF Reaction 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

| | | | |
|---|---|---|---|
| **For non-emergency personnel** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. |
| **For emergency responders** | : | PfuUltra HF DNA Polymerase | 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". |
| | | 10X PfuUltra HF Reaction 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". |
| **6.2 Environmental precautions** | : | PfuUltra HF DNA Polymerase | 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). |
| | | 10X PfuUltra HF Reaction 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). |

# Section 6. Accidental release measures

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

| | | | |
|---|---|---|---|
| **Methods for cleaning up** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction 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. 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** | : | PfuUltra HF DNA Polymerase | 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. |
| | | 10X PfuUltra HF Reaction Buffer | 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. |
| **7.2 Conditions for safe storage, including any incompatibilities** | : | PfuUltra HF DNA Polymerase | 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 |

# Section 7. Handling and storage

| | |
|---|---|
| 10X PfuUltra HF Reaction Buffer | environmental contamination. See Section 10 for incompatible materials before handling or use. 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)

| | | | |
|---|---|---|---|
| **Recommendations** | : | PfuUltra HF DNA Polymerase | Industrial applications, Professional applications. |
| | | 10X PfuUltra HF Reaction Buffer | Industrial applications, Professional applications. |
| **Industrial sector specific solutions** | : | PfuUltra HF DNA Polymerase | Not applicable. |
| | | 10X PfuUltra HF Reaction Buffer | Not applicable. |

# Section 8. Exposure controls/personal protection

## 8.1 Control parameters

### Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| **PfuUltra HF DNA Polymerase** | |
| Glycerol | **OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 10 mg/m³ 8 hours. Form: Total dust<br>**OSHA PEL (United States, 5/2018).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 15 mg/m³ 8 hours. Form: Total dust |
| Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy- | None. |
| **10X PfuUltra HF Reaction Buffer** | |
| 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride | None. |
| Polyoxyethylene octyl phenyl ether | None. |
| Ammonium sulphate | None. |

## 8.2 Exposure controls

| | | |
|---|---|---|
| **Appropriate engineering controls** | : | Good general ventilation should be sufficient to control worker exposure to airborne contaminants. |
| **Environmental exposure controls** | : | 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

**9.1 Information on basic physical and chemical properties**

**Appearance**

| | | | |
|---|---|---|---|
| **Physical state** | : | PfuUltra HF DNA Polymerase | Liquid. |
| | | 10X PfuUltra HF Reaction Buffer | Liquid. |
| **Color** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Odor** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Odor threshold** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **pH** | : | PfuUltra HF DNA Polymerase | 8.2 |
| | | 10X PfuUltra HF Reaction Buffer | 8.8 |
| **Melting point** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | 0°C (32°F) |
| **Boiling point** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | 100°C (212°F) |
| **Flash point** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Evaporation rate** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Flammability (solid, gas)** | : | PfuUltra HF DNA Polymerase | Not applicable. |
| | | 10X PfuUltra HF Reaction Buffer | Not applicable. |
| **Lower and upper explosive (flammable) limits** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |

## Section 9. Physical and chemical properties

| | | | |
|---|---|---|---|
| **Vapor pressure** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Vapor density** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Relative density** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Solubility** | : | PfuUltra HF DNA Polymerase | Soluble in the following materials: cold water and hot water. |
| | | 10X PfuUltra HF Reaction Buffer | Easily soluble in the following materials: cold water and hot water. |
| **Partition coefficient: n-octanol/water** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Auto-ignition temperature** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Decomposition temperature** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |
| **Viscosity** | : | PfuUltra HF DNA Polymerase | Not available. |
| | | 10X PfuUltra HF Reaction Buffer | Not available. |

## Section 10. Stability and reactivity

| | | | |
|---|---|---|---|
| **10.1 Reactivity** | : | PfuUltra HF DNA Polymerase | No specific test data related to reactivity available for this product or its ingredients. |
| | | 10X PfuUltra HF Reaction Buffer | No specific test data related to reactivity available for this product or its ingredients. |
| **10.2 Chemical stability** | : | PfuUltra HF DNA Polymerase | The product is stable. |
| | | 10X PfuUltra HF Reaction Buffer | The product is stable. |
| **10.3 Possibility of hazardous reactions** | : | PfuUltra HF DNA Polymerase | Under normal conditions of storage and use, hazardous reactions will not occur. |
| | | 10X PfuUltra HF Reaction Buffer | Under normal conditions of storage and use, hazardous reactions will not occur. |
| **10.4 Conditions to avoid** | : | PfuUltra HF DNA Polymerase | No specific data. |
| | | 10X PfuUltra HF Reaction Buffer | No specific data. |
| **10.5 Incompatible materials** | : | PfuUltra HF DNA Polymerase | May react or be incompatible with oxidizing materials. |
| | | 10X PfuUltra HF Reaction Buffer | May react or be incompatible with oxidizing materials. |
| **10.6 Hazardous decomposition products** | : | PfuUltra HF DNA Polymerase | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| | | 10X PfuUltra HF Reaction 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 |
|---|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | | |
| Glycerol | LD50 Oral | Rat | 12600 mg/kg | - |
| Poly(oxy-1,2-ethanediyl), . alpha.-[ (1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy- | LD50 Oral | Rat | 2800 mg/kg | - |
| **10X PfuUltra HF Reaction Buffer** | | | | |
| Polyoxyethylene octyl phenyl ether | LD50 Oral | Rat | 1800 mg/kg | - |
| Ammonium sulphate | LD50 Oral | Rat | 2840 mg/kg | - |

### Irritation/Corrosion

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | | | |
| Glycerol | Eyes - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| Poly(oxy-1,2-ethanediyl), . alpha.-[ (1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy- | Eyes - Severe irritant | Rabbit | - | 1 Percent | - |
| **10X PfuUltra HF Reaction Buffer** | | | | | |
| Polyoxyethylene octyl phenyl ether | Skin - Mild irritant | Rabbit | - | 24 hours 500 microliters | - |

### 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)

# Section 11. Toxicological information

| Name | Category | Route of exposure | Target organs |
|---|---|---|---|
| **10X PfuUltra HF Reaction Buffer** | | | |
| 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride | Category 3 | Not applicable. | Respiratory tract irritation |
| Polyoxyethylene octyl phenyl ether | Category 3 | Not applicable. | Respiratory tract irritation |

## Specific target organ toxicity (repeated exposure)

Not available.

## Aspiration hazard

Not available.

**Information on the likely routes of exposure**

: PfuUltra HF DNA Polymerase — Routes of entry anticipated: Oral, Dermal, Inhalation.

10X PfuUltra HF Reaction Buffer — Routes of entry anticipated: Oral, Dermal, Inhalation.

## Potential acute health effects

**Eye contact**

: PfuUltra HF DNA Polymerase — Causes eye irritation.

10X PfuUltra HF Reaction Buffer — Causes serious eye irritation.

**Inhalation**

: PfuUltra HF DNA Polymerase — No known significant effects or critical hazards.

10X PfuUltra HF Reaction Buffer — No known significant effects or critical hazards.

**Skin contact**

: PfuUltra HF DNA Polymerase — No known significant effects or critical hazards.

10X PfuUltra HF Reaction Buffer — No known significant effects or critical hazards.

**Ingestion**

: PfuUltra HF DNA Polymerase — No known significant effects or critical hazards.

10X PfuUltra HF Reaction Buffer — No known significant effects or critical hazards.

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

**Eye contact**

: PfuUltra HF DNA Polymerase — Adverse symptoms may include the following:
irritation
watering
redness

10X PfuUltra HF Reaction Buffer — Adverse symptoms may include the following:
pain or irritation
watering
redness

**Inhalation**

: PfuUltra HF DNA Polymerase — No specific data.

10X PfuUltra HF Reaction Buffer — No specific data.

**Skin contact**

: PfuUltra HF DNA Polymerase — No specific data.

10X PfuUltra HF Reaction Buffer — No specific data.

**Ingestion**

: PfuUltra HF DNA Polymerase — No specific data.

10X PfuUltra HF Reaction 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.

# Section 11. Toxicological information

**Potential delayed effects** : Not available.

**Potential chronic health effects**

| | | | |
|---|---|---|---|
| **General** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Carcinogenicity** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Mutagenicity** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Teratogenicity** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Developmental effects** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | No known significant effects or critical hazards. |
| **Fertility effects** | : | PfuUltra HF DNA Polymerase | No known significant effects or critical hazards. |
| | | 10X PfuUltra HF Reaction Buffer | 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) |
|---|---|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | | | |
| Glycerol | 12600 | N/A | N/A | N/A | N/A |
| Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy- | 2800 | N/A | N/A | N/A | N/A |
| **10X PfuUltra HF Reaction Buffer** | | | | | |
| 10X PfuUltra HF Reaction Buffer | 180000 | N/A | N/A | N/A | N/A |
| Polyoxyethylene octyl phenyl ether | 1800 | N/A | N/A | N/A | N/A |
| Ammonium sulphate | 2840 | N/A | N/A | N/A | N/A |

# Section 12. Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | |
| Glycerol | Acute LC50 54000 mg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy- | Acute EC50 210 µg/l Fresh water | Algae - Pseudokirchneriella subcapitata | 96 hours |
| | Acute LC50 10800 µg/l Marine water | Crustaceans - Pandalus montagui - Adult | 48 hours |
| | Acute LC50 8600 µg/l Fresh water | Daphnia - Daphnia magna - Neonate | 48 hours |
| | Acute LC50 7200 µg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| **10X PfuUltra HF Reaction Buffer** | | | |
| Polyoxyethylene octyl phenyl ether | Acute LC50 5.85 mg/l Fresh water | Crustaceans - Ceriodaphnia rigaudi - Neonate | 48 hours |

# Section 12. Ecological information

| | | | |
|---|---|---|---|
| Ammonium sulphate | 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 |
| | Acute LC50 2.6 mg/l Fresh water | Crustaceans - Ceriodaphnia dubia - Young | 48 hours |
| | Acute LC50 14000 µg/l Fresh water | Daphnia - Daphnia magna - Young | 48 hours |
| | Acute LC50 68 µg/l Fresh water | Fish - Oncorhynchus gorbuscha - Alevin | 96 hours |
| | Chronic NOEC 7.5 mg/l Marine water | Algae - Phaeodactylum tricornutum - Exponential growth phase | 96 hours |
| | Chronic NOEC 143 µg/l Marine water | Fish - Salmo salar - Post-smolt | 5 weeks |

## 12.2 Persistence and degradability

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | | |
| Glycerol | 301D Ready Biodegradability - Closed Bottle Test | 93 % - 30 days | - | - |

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| **10X PfuUltra HF Reaction Buffer** | | | |
| Polyoxyethylene octyl phenyl ether | - | - | Readily |
| Ammonium sulphate | - | - | Readily |

## 12.3 Bioaccumulative potential

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| **PfuUltra HF DNA Polymerase** | | | |
| Glycerol | -1.76 | - | low |
| Poly(oxy-1,2-ethanediyl), . alpha.-[ (1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy- | 3.77 | 78.67 | low |
| **10X PfuUltra HF Reaction Buffer** | | | |
| Polyoxyethylene octyl phenyl ether | 4.86 | - | high |
| Ammonium sulphate | -5.1 | - | low |

## 12.4 Mobility in soil

**Soil/water partition coefficient ($K_{OC}$)** : 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 Annex II of MARPOL and the IBC Code** : 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**: Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-; 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

# Section 15. Regulatory information

**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** :

| | |
|---|---|
| PfuUltra HF DNA Polymerase | EYE IRRITATION - Category 2B |
| 10X PfuUltra HF Reaction Buffer | EYE IRRITATION - Category 2A |

### Composition/information on ingredients

| Name | % | Classification |
|---|---|---|
| **PfuUltra HF DNA Polymerase** | | |
| Glycerol | ≥50 - ≤75 | EYE IRRITATION - Category 2A |
| **10X PfuUltra HF Reaction Buffer** | | |
| 2-Amino-2-(hydroxymethyl) propane-1,3-diol hydrochloride | ≤5 | SKIN IRRITATION - Category 2<br>EYE IRRITATION - Category 2A<br>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 |
| Polyoxyethylene octyl phenyl ether | ≤2.3 | ACUTE TOXICITY (oral) - Category 4<br>SKIN IRRITATION - Category 2<br>SERIOUS EYE DAMAGE - Category 1<br>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 |

## 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; 1,2,3-PROPANETRIOL

**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.

### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

## Inventory list

# Section 15. Regulatory information

**Australia** : All components are listed or exempted.

**Canada** : All components are listed or exempted.

**China** : All components are listed or exempted.

**Europe** : All components are listed or exempted.

**Japan** : **Japan inventory (ENCS)**: Not determined.
**Japan inventory (ISHL)**: Not determined.

**New Zealand** : All components are listed or exempted.

**Philippines** : All components are listed or exempted.

**Republic of Korea** : Not determined.

**Taiwan** : All components are listed or exempted.

**Thailand** : Not determined.

**Turkey** : Not determined.

**United States** : All components are listed or exempted.

**Viet Nam** : Not determined.

# Section 16. Other information

## History

**Date of issue** : 09/25/2019

**Date of previous issue** : 06/21/2017

**Version** : 5

**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

## Procedure used to derive the classification

| Classification | Justification |
|---|---|
| **PfuUltra HF DNA Polymerase**<br>EYE IRRITATION - Category 2B | Calculation method |
| **10X PfuUltra HF Reaction Buffer**<br>EYE IRRITATION - Category 2A | Calculation method |

**Indicates information that has changed from previously issued version.**

## Notice to reader

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