

SAFETY DATA SHEET



PfuUltra High-Fidelity DNA Polymerase, Part Number 600384

Section 1. Identification

1.1 Product identifier

Product name : PfuUltra High-Fidelity DNA Polymerase, Part Number 600384
Part No. (Chemical Kit) : 600384
Part No. : PfuUltra HF DNA Polymerase 600380-51
 10X PfuUltra HF Reaction Buffer 600380-52
Validation date : 6/21/2017

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

Material uses : Analytical reagent.
 PfuUltra HF DNA Polymerase 40 µl (100 U 2.5 U/µl)
 10X PfuUltra HF Reaction Buffer 4 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 inhalation toxicity: 30 - 60%
 10X PfuUltra HF Reaction Buffer Percentage of the mixture consisting of ingredient (s) of unknown dermal toxicity: 1 - 10%
 Percentage of the mixture consisting of ingredient (s) of unknown inhalation toxicity: 1 - 10%
 Percentage of the mixture consisting of ingredient (s) of unknown oral toxicity: 1 - 10%

2.2 GHS label elements

Hazard pictograms : 10X PfuUltra HF Reaction Buffer



Section 2. Hazards identification

Signal word	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Warning Warning
Hazard statements	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	H320 - Causes eye irritation. H319 - Causes serious eye irritation.
<u>Precautionary statements</u>		
Prevention	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	P264 - Wash hands thoroughly after handling. P280 - Wear eye or face protection. P264 - Wash hands thoroughly after handling.
Response	: PfuUltra HF DNA Polymerase 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. P337 + P313 - If eye irritation persists: Get medical 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 attention.
Storage	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Not applicable. Not applicable.
Disposal	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Not applicable. Not applicable.
Supplemental label elements	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	None known. None known.
<u>2.3 Other hazards</u>		
Hazards not otherwise classified	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	None known. None known.

Section 3. Composition/information on ingredients

Substance/mixture	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Mixture Mixture
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Ingredient name	%	CAS number
PfuUltra HF DNA Polymerase		
Glycerol	≥50 - ≤75	56-81-5
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

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.

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 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. If irritation persists, get medical attention. 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 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. 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 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. 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.
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

Section 4. First aid measures

10X PfuUltra HF Reaction Buffer	<p>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.</p> <p>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.</p>
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4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

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

Over-exposure signs/symptoms

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

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

Section 4. First aid measures

Notes to physician	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction 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.
Specific treatments	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific treatment. No specific treatment.
Protection of first-aiders	: PfuUltra HF DNA Polymerase 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. 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 10X PfuUltra HF Reaction Buffer	Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	None known. None known.

5.2 Special hazards arising from the substance or mixture

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

5.3 Advice for firefighters

Special protective actions for fire-fighters	: PfuUltra HF DNA Polymerase 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. 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.
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Section 5. Fire-fighting measures

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).

6.3 Methods and materials for containment and cleaning up

Section 6. Accidental release measures

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 environmental contamination. See Section 10 for incompatible materials before handling or use.
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Section 7. Handling and storage

10X PfuUltra HF Reaction 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)

Recommendations	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Industrial applications, Professional applications. Industrial applications, Professional applications.
Industrial sector specific solutions	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Not applicable. 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). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 10 mg/m ³ 8 hours. Form: Total dust OSHA PEL (United States, 6/2016). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust
10X PfuUltra HF Reaction Buffer 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride Polyoxyethylene octyl phenyl ether	None. 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

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.
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Section 8. Exposure controls/personal protection

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

Section 9. Physical and chemical properties

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

Section 10. Stability and reactivity

10.1 Reactivity	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific test data related to reactivity available for this product or its ingredients. No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	The product is stable. The product is stable.
10.3 Possibility of hazardous reactions	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific data. No specific data.
10.5 Incompatible materials	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials.
10.6 Hazardous decomposition products	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Under normal conditions of storage and use, hazardous decomposition products should not be produced. 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

Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
PfuUltra HF DNA Polymerase Glycerol	LD50 Oral	Rat	12600 mg/kg	-
10X PfuUltra HF Reaction Buffer Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 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
10X PfuUltra HF Reaction Buffer Polyoxyethylene octyl phenyl ether	Eyes - Moderate irritant	Rabbit	-	24 hours 10 microliters	-
	Skin - Mild irritant	Rabbit	-		24 hours 500 microliters

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

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

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Routes of entry anticipated: Oral, Dermal, Inhalation. Routes of entry anticipated: Oral, Dermal, Inhalation.
Potential acute health effects		
Eye contact	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Causes eye irritation. Causes serious eye irritation.
Inhalation	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Skin contact	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Ingestion	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	Adverse symptoms may include the following: irritation watering redness Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific data. No specific data.
Skin contact	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific data. No specific data.
Ingestion	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No specific data. 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		
General	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Carcinogenicity	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Mutagenicity	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Teratogenicity	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Developmental effects	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Fertility effects	: PfuUltra HF DNA Polymerase 10X PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

Section 11. Toxicological information

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
10X PfuUltra HF Reaction Buffer Oral	180000 mg/kg

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
10X PfuUltra HF Reaction Buffer 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	Aquatic half-life	Photolysis	Biodegradability
10X PfuUltra HF Reaction Buffer Polyoxyethylene octyl phenyl ether	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
PfuUltra HF DNA Polymerase Glycerol	-1.76	-	low
10X PfuUltra HF Reaction Buffer Polyoxyethylene octyl phenyl ether	4.86	-	high

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

DEA List I Chemicals (Precursor Chemicals) : Not listed

Section 15. Regulatory information

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 Immediate (acute) health hazard
10X PfuUltra HF Reaction Buffer Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
PfuUltra HF DNA Polymerase						
Glycerol	≥50 - ≤75	No.	No.	No.	Yes.	No.
10X PfuUltra HF Reaction Buffer						
2-Amino-2-(hydroxymethyl)propane-1, 3-diol hydrochloride	≤5	No.	No.	No.	Yes.	No.
Polyoxyethylene octyl phenyl ether	≤2.3	No.	No.	No.	Yes.	No.

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

Not available.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

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

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.

Section 15. Regulatory information

Japan	: <input checked="" type="checkbox"/> Japan inventory (ENCS): Not determined. Japan inventory (ISHL): Not determined.
Malaysia	: 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	: <input checked="" type="checkbox"/> Not determined.
Turkey	: <input checked="" type="checkbox"/> Not determined.
United States	: All components are listed or exempted.
Viet Nam	: <input checked="" type="checkbox"/> Not determined.

Section 16. Other information

History

Date of issue	: 06/21/2017
Date of previous issue	: 10/28/2015.
Version	: 4

Indicates information that has changed from previously issued version.

Notice to reader

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