

# SAFETY DATA SHEET



PfuUltra Hotstart DNA Polymerase, Part Number 600390

## Section 1. Identification

### 1.1 Product identifier

**Product name** : PfuUltra Hotstart DNA Polymerase, Part Number 600390  
**Part No. (Chemical Kit)** : 600390  
**Part No.** : PfuUltra Hotstart DNA Polymerase 600390-51  
 10x PfuUltra HF Reaction Buffer 600380-52  
**Validation date** : 1/30/2015.

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

**Material uses** : Analytical reagent.  
 PfuUltra Hotstart DNA Polymerase 0.04 ml  
 10x PfuUltra HF Reaction Buffer 4 ml

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

**Supplier/Manufacturer** : Agilent Technologies, Inc.  
 Logistics Center - Americas  
 500 Ships Landing Way  
 New Castle, Delaware 19720  
 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 Hotstart 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).  
 Buffer

### Classification of the substance or mixture

**PfuUltra Hotstart DNA Polymerase**  
 H320

SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B

**10x PfuUltra HF Reaction Buffer**  
 H319

SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A

**Ingredients of unknown toxicity** : PfuUltra Hotstart DNA Polymerase Not applicable.  
 10x PfuUltra HF Reaction Buffer Percentage of the mixture consisting of ingredient (s) of unknown toxicity: 3.2%

### 2.2 GHS label elements

**Hazard pictograms** :



## Section 2. Hazards identification

<b>Signal word</b>	:	PfuUltra Hotstart DNA Polymerase	Warning
		10x PfuUltra HF Reaction Buffer	Warning
<b>Hazard statements</b>	:	PfuUltra Hotstart DNA Polymerase	H320 - Causes eye irritation.
		10x PfuUltra HF Reaction Buffer	H319 - Causes serious eye irritation.
<b><u>Precautionary statements</u></b>			
<b>General</b>	:	PfuUltra Hotstart DNA Polymerase	Not applicable.
		10x PfuUltra HF Reaction Buffer	Not applicable.
<b>Prevention</b>	:	PfuUltra Hotstart DNA Polymerase	P280 - Wear eye or face protection.
			P264 - Wash hands thoroughly after handling.
		10x PfuUltra HF Reaction Buffer	P280 - Wear eye or face protection.
			P264 - Wash hands thoroughly after handling.
<b>Response</b>	:	PfuUltra Hotstart 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.
			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.
			P337 + P313 - If eye irritation persists: Get medical attention.
<b>Storage</b>	:	PfuUltra Hotstart DNA Polymerase	Not applicable.
		10x PfuUltra HF Reaction Buffer	Not applicable.
<b>Disposal</b>	:	PfuUltra Hotstart DNA Polymerase	Not applicable.
		10x PfuUltra HF Reaction Buffer	Not applicable.

### 2.3 Other hazards

<b>Hazards not otherwise classified</b>	:	PfuUltra Hotstart DNA Polymerase	None known.
		10x PfuUltra HF Reaction Buffer	None known.

## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	:	PfuUltra Hotstart DNA Polymerase	Mixture
		10x PfuUltra HF Reaction Buffer	Mixture

Ingredient name	%	CAS number
<b>PfuUltra Hotstart DNA Polymerase</b>		
Glycerol	30 - 60	56-81-5
<b>10x PfuUltra HF Reaction Buffer</b>		
2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride	1 - 5	1185-53-1
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	0.1 - 1	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

<b>Eye contact</b>	: PfuUltra Hotstart 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.
<b>Inhalation</b>	: PfuUltra Hotstart 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.
<b>Skin contact</b>	: PfuUltra Hotstart 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.
<b>Ingestion</b>	: PfuUltra Hotstart 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

	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

<b>Eye contact</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Causes eye irritation. Causes serious eye irritation.
<b>Inhalation</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
<b>Skin contact</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Ingestion</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	May be irritating to mouth, throat and stomach. Irritating to mouth, throat and stomach.

#### Over-exposure signs/symptoms

<b>Eye contact</b>	: PfuUltra Hotstart 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
<b>Inhalation</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
<b>Skin contact</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
<b>Ingestion</b>	: PfuUltra Hotstart 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

<b>Notes to physician</b>	: PfuUltra Hotstart 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.
<b>Specific treatments</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific treatment. No specific treatment.
<b>Protection of first-aiders</b>	: PfuUltra Hotstart 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

<b>Suitable extinguishing media</b>	: PfuUltra Hotstart 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.
<b>Unsuitable extinguishing media</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	None known. None known.

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

<b>Specific hazards arising from the chemical</b>	: PfuUltra Hotstart 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.
<b>Hazardous thermal decomposition products</b>	: PfuUltra Hotstart 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

<b>Special protective actions for fire-fighters</b>	: PfuUltra Hotstart 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

<b>Special protective equipment for fire-fighters</b>	: PfuUltra Hotstart 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

<b>For non-emergency personnel</b>	: PfuUltra Hotstart 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.
<b>For emergency responders</b>	: PfuUltra Hotstart DNA Polymerase	If specialised 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 specialised 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>	: PfuUltra Hotstart 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

PfuUltra Hotstart 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

<b>Protective measures</b>	: PfuUltra Hotstart 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.
<b>Advice on general occupational hygiene</b>	: 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 Hotstart 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.
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.

### 7.3 Specific end use(s)

## Section 7. Handling and storage

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

## Section 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
PfuUltra Hotstart DNA Polymerase Glycerol	<p><b>OSHA PEL 1989 (United States, 3/1989).</b>            TWA: 5 mg/m<sup>3</sup> 8 hours. Form: Respirable fraction</p> <p>TWA: 10 mg/m<sup>3</sup> 8 hours. Form: Total dust</p> <p><b>OSHA PEL (United States, 2/2013).</b>            TWA: 5 mg/m<sup>3</sup> 8 hours. Form: Respirable fraction</p> <p>TWA: 15 mg/m<sup>3</sup> 8 hours. Form: Total dust</p>

### 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.
- 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.



## Section 8. Exposure controls/personal protection

- 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** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	: PfuUltra Hotstart DNA Polymerase	Liquid.
	10x PfuUltra HF Reaction Buffer	Liquid.
<b>Color</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Odor</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Odor threshold</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>pH</b>	: PfuUltra Hotstart DNA Polymerase	8.2
	10x PfuUltra HF Reaction Buffer	8.8
<b>Melting point</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	0°C (32°F)
<b>Boiling point</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	100°C (212°F)
<b>Flash point</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Evaporation rate</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Flammability (solid, gas)</b>	: PfuUltra Hotstart DNA Polymerase	Not applicable.
	10x PfuUltra HF Reaction Buffer	Not applicable.
<b>Lower and upper explosive (flammable) limits</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Vapor pressure</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Vapor density</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Relative density</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Solubility</b>	: PfuUltra Hotstart 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.
<b>Solubility in water</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
<b>Partition coefficient: n-octanol/water</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Auto-ignition temperature</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Decomposition temperature</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
<b>Viscosity</b>	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.

## Section 10. Stability and reactivity

<b>10.1 Reactivity</b>	: PfuUltra Hotstart 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.
<b>10.2 Chemical stability</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	The product is stable. The product is stable.
<b>10.3 Possibility of hazardous reactions</b>	: PfuUltra Hotstart 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.
<b>10.4 Conditions to avoid</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
<b>10.5 Incompatible materials</b>	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
<b>10.6 Hazardous decomposition products</b>	: PfuUltra Hotstart 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

Product/ingredient name	Result	Species	Dose	Exposure
<b>PfuUltra Hotstart DNA Polymerase</b> Glycerol	LD50 Oral	Rat	12600 mg/kg	-
<b>10x PfuUltra HF Reaction Buffer</b> Poly(oxy-1,2-ethanediyl), . alpha.-[4-(1,1,3, 3-tetramethylbutyl)phenyl]- omega.-hydroxy-	LD50 Oral	Rat	1800 mg/kg	-

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
<b>PfuUltra Hotstart DNA Polymerase</b> Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-		24 hours 500 milligrams
<b>10x PfuUltra HF Reaction Buffer</b> Poly(oxy-1,2-ethanediyl), . alpha.-[4-(1,1,3,	Eyes - Moderate irritant	Rabbit	-	24 hours 10 microliters	-

## Section 11. Toxicological information

3-tetramethylbutyl)phenyl]- omega.-hydroxy-	Skin - Mild irritant	Rabbit	-	24 hours 500 microliters	-
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### 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
<b>10x PfuUltra HF Reaction Buffer</b> 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.

**Information on the likely routes of exposure** : PfuUltra Hotstart DNA Polymerase Not available.  
10x PfuUltra HF Reaction Buffer Routes of entry anticipated: Oral, Dermal, Inhalation.

### Potential acute health effects

**Eye contact** : PfuUltra Hotstart DNA Polymerase Causes eye irritation.  
10x PfuUltra HF Reaction Buffer Causes serious eye irritation.

**Inhalation** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

**Skin contact** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Ingestion** : PfuUltra Hotstart DNA Polymerase May be irritating to mouth, throat and stomach.  
10x PfuUltra HF Reaction Buffer Irritating to mouth, throat and stomach.

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

## Section 11. Toxicological information

<b>Eye contact</b>	: PfuUltra Hotstart 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
<b>Inhalation</b>	: PfuUltra Hotstart DNA Polymerase	No specific data.
	10x PfuUltra HF Reaction Buffer	No specific data.
<b>Skin contact</b>	: PfuUltra Hotstart DNA Polymerase	No specific data.
	10x PfuUltra HF Reaction Buffer	No specific data.
<b>Ingestion</b>	: PfuUltra Hotstart 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.

**Potential delayed effects** : Not available.

#### Potential chronic health effects

**General** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Carcinogenicity** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Mutagenicity** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Teratogenicity** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Developmental effects** : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.  
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

**Fertility effects** : PfuUltra Hotstart 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

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

**Other information** : PfuUltra Hotstart DNA Polymerase Not available.  
10x PfuUltra HF Reaction Buffer Not available.

## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<b>10x PfuUltra HF Reaction Buffer</b> Poly(oxy-1,2-ethanediyl), . alpha.-[4-(1,1,3, 3-tetramethylbutyl)phenyl]- omega.-hydroxy-	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
<b>10x PfuUltra HF Reaction Buffer</b> Poly(oxy-1,2-ethanediyl), . alpha.-[4-(1,1,3, 3-tetramethylbutyl)phenyl]- omega.-hydroxy-	-	-	Readily

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>PfuUltra Hotstart DNA Polymerase</b> Glycerol	-1.76	-	low
<b>10x PfuUltra HF Reaction Buffer</b> Poly(oxy-1,2-ethanediyl), . alpha.-[4-(1,1,3, 3-tetramethylbutyl)phenyl]- omega.-hydroxy-	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

## Section 13. Disposal considerations

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.

**RCRA classification** : PfuUltra Hotstart DNA Polymerase Not available.  
10x PfuUltra HF Reaction Buffer Not available.

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

### Regulatory information

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

## 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-; Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-

**United States inventory (TSCA 8b)**: All components are listed or exempted.

**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** : Immediate (acute) health hazard

#### Composition/information on ingredients

## Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
PfuUltra Hotstart DNA Polymerase Glycerol	30 - 60	No.	No.	No.	Yes.	No.
10x PfuUltra HF Reaction Buffer 2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride	1 - 5	No.	No.	No.	Yes.	No.
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	0.1 - 1	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

No products were found.

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

### International regulations

- International lists** :
- Australia inventory (AICS)**: All components are listed or exempted.
  - China inventory (IECSC)**: All components are listed or exempted.
  - Japan inventory**: Not determined.
  - Korea inventory**: Not determined.
  - Malaysia Inventory (EHS Register)**: Not determined.
  - New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
  - Philippines inventory (PICCS)**: All components are listed or exempted.
  - Taiwan inventory (CSNN)**: Not determined.

- Chemical Weapons Convention List Schedule I Chemicals** : Not listed

- Chemical Weapons Convention List Schedule II Chemicals** : Not listed

- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

## Section 16. Other information

### History

- Date of issue** : 1/30/2015.
- Date of previous issue** : 12/10/2012.
- Version** : 3

✔ Indicates information that has changed from previously issued version.

### Notice to reader

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