

SAFETY DATA SHEET



PfuUltra Hotstart DNA Polymerase, Part Number 600390

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : PfuUltra Hotstart DNA Polymerase, Part Number 600390
Part No. (Kit) : 600390
Part No. : PfuUltra Hotstart DNA Polymerase 600390-51
10x PfuUltra HF Reaction Buffer 600380-52

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

Identified uses	
Analytical reagent.	
PfuUltra Hotstart DNA Polymerase	0.04 ml (100 U 2.5 U/μl)
10x PfuUltra HF Reaction Buffer	1 ml

1.3 Details of the supplier of the safety data sheet

Agilent Technologies Manufacturing GmbH & Co. KG
Hewlett-Packard-Str. 8
76337 Waldbronn
Germany
0800 603 1000

e-mail address of person responsible for this SDS : pdl-msds_author@agilent.com

1.4 Emergency telephone number

Emergency telephone number (with hours of operation) : CHEMTREC®: +(44)-870-8200418

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : PfuUltra Hotstart DNA Polymerase Mixture
10x PfuUltra HF Reaction Buffer Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

10x PfuUltra HF Reaction Buffer

Buffer

H319 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2

Ingredients of unknown toxicity : PfuUltra Hotstart 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%

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SECTION 2: Hazards identification

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

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms : 10x PfuUltra HF Reaction Buffer



Signal word : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
No signal word.
Warning

Hazard statements : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
No known significant effects or critical hazards.
H319 - Causes serious eye irritation.

Precautionary statements

Prevention : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
P280 - Wear eye or face protection.
P264 - Wash hands thoroughly after handling.

Response : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
Not applicable.

Disposal : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
Not applicable.

Hazardous ingredients : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
Not applicable.

Supplemental label elements : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
Not applicable.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : PfuUltra Hotstart DNA Polymerase
10x PfuUltra HF Reaction Buffer
Not applicable.
Not applicable.

Special packaging requirements

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SECTION 2: Hazards identification

Tactile warning of danger : PfuUltra Hotstart DNA Polymerase Not applicable.
 10x PfuUltra HF Reaction Buffer Not applicable.

2.3 Other hazards

Other hazards which do not result in classification : PfuUltra Hotstart DNA Polymerase None known.
 10x PfuUltra HF Reaction Buffer None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : PfuUltra Hotstart DNA Polymerase Mixture
 10x PfuUltra HF Reaction Buffer Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
PfuUltra Hotstart DNA Polymerase				
Glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥50 - ≤75	Not classified.	[2]
Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	CAS: 9036-19-5	≤0.3	Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Chronic 2, H411	[1] [5]
10x PfuUltra HF Reaction Buffer				
2-Amino-2-(hydroxymethyl) propane-1,3-diol hydrochloride	EC: 214-684-5 CAS: 1185-53-1	≤5	Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335	[1]
Polyoxyethylene octyl phenyl ether	CAS: 9002-93-1	≤2.3	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Chronic 2, H411	[1] [5]
			See Section 16 for the full text of the H statements declared above.	

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.

Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
- [5] Substance of equivalent concern
- [6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact : 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. Get medical attention if irritation occurs.
 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.

Date of issue/Date of revision : 31/05/2017

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SECTION 4: First aid measures

Inhalation	: PfuUltra Hotstart DNA Polymerase	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	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 Hotstart DNA Polymerase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	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.
Ingestion	: PfuUltra Hotstart DNA Polymerase	Wash out mouth with water. 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. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
	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.
Protection of first-aiders	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No action shall be taken involving any personal risk or without suitable training. 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.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact	: PfuUltra Hotstart DNA Polymerase	No known significant effects or critical hazards.
	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	No known significant effects or critical hazards.

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SECTION 4: First aid measures

Skin contact	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Ingestion	: PfuUltra Hotstart 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 Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
Skin contact	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.
Ingestion	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific data. No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	: 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.
Specific treatments	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	No specific treatment. No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	: 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.
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SECTION 5: Firefighting measures

Hazardous combustion products	: PfuUltra Hotstart DNA Polymerase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	10x PfuUltra HF Reaction Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds

5.3 Advice for firefighters

Special precautions for fire-fighters	: PfuUltra Hotstart 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 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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
	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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: 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 spilt material. 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 spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: 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".

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SECTION 6: Accidental release measures

6.2 Environmental precautions	: PfuUltra Hotstart DNA Polymerase	Avoid dispersal of spilt 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 spilt 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 material for containment and cleaning up

Methods for cleaning up	: 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.

6.4 Reference to other sections	: See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.
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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures	: PfuUltra Hotstart DNA Polymerase	Put on appropriate personal protective equipment (see Section 8).
	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 vapour 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 Hotstart 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

Storage	: 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials
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SECTION 7: Handling and storage

10x PfuUltra HF
Reaction Buffer

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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
PfuUltra Hotstart DNA Polymerase Glycerol	EH40/2005 WELs (United Kingdom (UK), 12/2011). TWA: 10 mg/m ³ 8 hours. Form: Mist

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

No DNELs/DMELs available.

PNECs

No PNECs available

8.2 Exposure controls

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

Individual protection measures

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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.
- 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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	: PfuUltra Hotstart DNA Polymerase	Liquid.
	10x PfuUltra HF Reaction Buffer	Liquid.
Colour	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
Odour	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
Odour threshold	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
pH	: PfuUltra Hotstart DNA Polymerase	8.2
	10x PfuUltra HF Reaction Buffer	8.8

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SECTION 9: Physical and chemical properties

Melting point/freezing point	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. 0°C
Initial boiling point and boiling range	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. 100°C
Flash point	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Evaporation rate	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Flammability (solid, gas)	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not applicable. Not applicable.
Upper/lower flammability or explosive limits	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Vapour pressure	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Vapour density	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Relative density	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Solubility(ies)	: PfuUltra Hotstart 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 Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Auto-ignition temperature	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Decomposition temperature	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.
Viscosity	: PfuUltra Hotstart DNA Polymerase 10x PfuUltra HF Reaction Buffer	Not available. Not available.

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SECTION 9: Physical and chemical properties

Explosive properties	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.
Oxidising properties	: PfuUltra Hotstart DNA Polymerase	Not available.
	10x PfuUltra HF Reaction Buffer	Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity	: PfuUltra Hotstart 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 Hotstart DNA Polymerase	The product is stable.
	10x PfuUltra HF Reaction Buffer	The product is stable.
10.3 Possibility of hazardous reactions	: PfuUltra Hotstart 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 Hotstart DNA Polymerase	No specific data.
	10x PfuUltra HF Reaction Buffer	No specific data.
10.5 Incompatible materials	: PfuUltra Hotstart DNA Polymerase	May react or be incompatible with oxidising materials.
	10x PfuUltra HF Reaction Buffer	May react or be incompatible with oxidising materials.
10.6 Hazardous decomposition products	: PfuUltra Hotstart 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 Hotstart DNA Polymerase 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				

Date of issue/Date of revision : 31/05/2017

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SECTION 11: Toxicological information

Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-
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Acute toxicity estimates

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

Irritation/Corrosion

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

Sensitiser

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient 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.

Information on likely routes of exposure : PfuUltra Hotstart 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

Inhalation : 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 No known significant effects or critical hazards.
10x PfuUltra HF Reaction Buffer No known significant effects or critical hazards.

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.

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SECTION 11: Toxicological information

Eye contact : PfuUltra Hotstart DNA Polymerase No known significant effects or critical hazards.
10x PfuUltra HF Causes serious eye irritation.
Reaction Buffer

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation : PfuUltra Hotstart DNA Polymerase No specific data.
10x PfuUltra HF No specific data.
Reaction Buffer

Ingestion : PfuUltra Hotstart DNA Polymerase No specific data.
10x PfuUltra HF No specific data.
Reaction Buffer

Skin contact : PfuUltra Hotstart DNA Polymerase No specific data.
10x PfuUltra HF No specific data.
Reaction Buffer

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

Delayed and immediate effects as well as 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 No known significant effects or critical hazards.
Reaction Buffer

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

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

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

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

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SECTION 11: Toxicological information

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.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
PfuUltra Hotstart DNA Polymerase 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 to 9800 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
	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

Not available.

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 Hotstart DNA Polymerase 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

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Mobility : Not available.

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SECTION 12: Ecological information

12.5 Results of PBT and vPvB assessment

PBT : Not applicable.
vPvB : Not applicable.

12.6 Other adverse effects : No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimised 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.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : 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 spill material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

ADR/RID / IMDG / IATA : Not regulated.

14.6 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.

14.7 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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

Ingredient name	Intrinsic property	Status	Reference number	Date of revision

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SECTION 15: Regulatory information

PfuUltra Hotstart DNA Polymerase Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	Substance of equivalent concern for environment	Recommended	ED/169/2012	2/10/2014
10x PfuUltra HF Reaction Buffer Polyoxyethylene octyl phenyl ether	Substance of equivalent concern for environment	Recommended	ED/169/2012	2/10/2014

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles :

PfuUltra Hotstart DNA Polymerase	Not applicable.
10x PfuUltra HF Reaction Buffer	Not applicable.

Other EU regulations

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is not controlled under the Seveso Directive.

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.
Japan	: 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	: Not determined.
Turkey	: Not determined.
United States	: All components are listed or exempted.

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SECTION 15: Regulatory information

Viet Nam : Not determined.

15.2 Chemical safety assessment : This product contains substances for which Chemical Safety Assessments might still be required.

SECTION 16: Other information

✔ Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 DNEL = Derived No Effect Level
 EUH statement = CLP-specific Hazard statement
 PNEC = Predicted No Effect Concentration
 RRN = REACH Registration Number

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
10x PfuUltra HF Reaction Buffer Eye Irrit. 2, H319	Calculation method

Full text of abbreviated H statements

PfuUltra Hotstart DNA Polymerase H315 H318 H411 10x PfuUltra HF Reaction Buffer H302 H315 H318 H319 H335 H411	Causes skin irritation. Causes serious eye damage. Toxic to aquatic life with long lasting effects. Harmful if swallowed. Causes skin irritation. Causes serious eye damage. Causes serious eye irritation. May cause respiratory irritation. Toxic to aquatic life with long lasting effects.
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Full text of classifications [CLP/GHS]

PfuUltra Hotstart DNA Polymerase Aquatic Chronic 2, H411 Eye Dam. 1, H318 Skin Irrit. 2, H315 10x PfuUltra HF Reaction Buffer Acute Tox. 4, H302 Aquatic Chronic 2, H411 Eye Dam. 1, H318 Eye Irrit. 2, H319 Skin Irrit. 2, H315 STOT SE 3, H335	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1 SKIN CORROSION/IRRITATION - Category 2 ACUTE TOXICITY (oral) - Category 4 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2 SKIN CORROSION/IRRITATION - Category 2 SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract irritation) - Category 3
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Date of issue/ Date of revision : 31/05/2017

Date of previous issue : No previous validation.

Version : 1

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