

SAFETY DATA SHEET



PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

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

1.1 Product identifier

Product name	:	PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410	
Part No. (Kit)	:	600410	
Part No.	:	PfuTurbo Cx Hotstart DNA Polymerase	600410-51
		10X PfuTurbo Cx Reaction Buffer	600410-52
		DMSO	600260-53

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

Identified uses	
Analytical reagent.	
PfuTurbo Cx Hotstart DNA Polymerase	40 µl (100 U 2.5 U/µl)
10X PfuTurbo Cx Reaction Buffer	4 x 1 ml
DMSO	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	:	PfuTurbo Cx Hotstart DNA Polymerase	Mixture
		10X PfuTurbo Cx Reaction Buffer	Mixture
		DMSO	Mono-constituent substance

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

10X PfuTurbo Cx Reaction Buffer
H319

SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410


SECTION 2: Hazards identification

Ingredients of unknown toxicity	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer	Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 30 - 60% 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%
Ingredients of unknown ecotoxicity	: 10X PfuTurbo Cx Reaction Buffer	Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3%

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 PfuTurbo Cx Reaction Buffer	
Signal word	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No signal word. Warning No signal word.
Hazard statements	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. H319 - Causes serious eye irritation. No known significant effects or critical hazards.
<u>Precautionary statements</u>		
Prevention	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not applicable. P280 - Wear eye or face protection. P264 - Wash hands thoroughly after handling. Not applicable.
Response	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	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. Not applicable.
Storage	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not applicable. Not applicable. Not applicable.
Disposal	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not applicable. Not applicable. Not applicable.
Hazardous ingredients	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer	Not applicable. Not applicable.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 2: Hazards identification

Supplemental label elements : PfuTurbo Cx Hotstart DNA Polymerase Not applicable.
 10X PfuTurbo Cx Reaction Buffer Not applicable.
 DMSO Not applicable.

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

Special packaging requirements

Tactile warning of danger : PfuTurbo Cx Hotstart DNA Polymerase Not applicable.
 10X PfuTurbo Cx Reaction Buffer Not applicable.
 DMSO Not applicable.

2.3 Other hazards

Other hazards which do not result in classification : PfuTurbo Cx Hotstart DNA Polymerase None known.
 10X PfuTurbo Cx Reaction Buffer None known.
 DMSO None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : PfuTurbo Cx Hotstart DNA Mixture
 Polymerase
 10X PfuTurbo Cx Reaction Buffer Mixture
 DMSO Mono-constituent substance

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
PfuTurbo Cx 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 PfuTurbo Cx 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	<2.5	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Chronic 2, H411	[1] [5]
DMSO Dimethyl sulfoxide	EC: 200-664-3 CAS: 67-68-5	100	Not classified. See Section 16 for the full text of the H statements declared above.	[A]

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 3: Composition/information on ingredients

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
- [A] Constituent
- [B] Impurity
- [C] Stabilising additive

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	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.
Inhalation	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact	: PfuTurbo Cx Hotstart DNA Polymerase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	10X PfuTurbo Cx 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.
	DMSO	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 4: First aid measures

Ingestion	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	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.
Protection of first-aiders	: PfuTurbo Cx Hotstart DNA Polymerase	No action shall be taken involving any personal risk or without suitable training.
	10X PfuTurbo Cx 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.
	DMSO	No action shall be taken involving any personal risk or without suitable training.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

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

Over-exposure signs/symptoms

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 4: First aid measures

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

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	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. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No specific treatment. No specific treatment. No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	None known. None known. None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	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. In a fire or if heated, a pressure increase will occur and the container may burst.
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PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 5: Firefighting measures

Hazardous combustion products	: PfuTurbo Cx Hotstart DNA Polymerase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	10X PfuTurbo Cx Reaction Buffer	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides halogenated compounds
	DMSO	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides

5.3 Advice for firefighters

Special precautions for fire-fighters	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	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	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	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	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	No action shall be taken involving any personal risk or

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 6: Accidental release measures

For emergency responders

: PfuTurbo Cx Hotstart DNA Polymerase

without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

10X PfuTurbo Cx 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".

DMSO

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".

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".

6.2 Environmental precautions

: PfuTurbo Cx 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 PfuTurbo Cx 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).

DMSO

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 material for containment and cleaning up

Methods for cleaning up

: PfuTurbo Cx 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 PfuTurbo Cx 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.

DMSO

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.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 7: Handling and storage

Protective measures	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer	Put on appropriate personal protective equipment (see Section 8). 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.
	DMSO	Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene	: PfuTurbo Cx 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 PfuTurbo Cx 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.
	DMSO	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	: PfuTurbo Cx 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 before handling or use.
	10X PfuTurbo Cx 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	DMSO	Storage temperature: -20°C (-4°F). 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.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 7: Handling and storage

7.3 Specific end use(s)

Recommendations	: PfuTurbo Cx Hotstart DNA Polymerase	Industrial applications, Professional applications.
	: 10X PfuTurbo Cx Reaction Buffer	Industrial applications, Professional applications.
	: DMSO	Industrial applications, Professional applications.
Industrial sector specific solutions	: PfuTurbo Cx Hotstart DNA Polymerase	Not applicable.
	: 10X PfuTurbo Cx Reaction Buffer	Not applicable.
	: DMSO	Not applicable.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
PfuTurbo Cx 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

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

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 8: Exposure controls/personal 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	: PfuTurbo Cx Hotstart DNA Polymerase	Liquid.
	10X PfuTurbo Cx Reaction Buffer	Liquid.
	DMSO	Liquid. [Clear.]
Colour	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Colourless.
Odour	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Odourless. [Slight]
Odour threshold	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Not available.
pH	: PfuTurbo Cx Hotstart DNA Polymerase	8.2
	10X PfuTurbo Cx Reaction Buffer	8.8
	DMSO	Not available.
Melting point/freezing point	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	0°C
	DMSO	18.5°C

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 9: Physical and chemical properties

Initial boiling point and boiling range	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. 100°C 189°C
Flash point	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. Closed cup: 87°C Open cup: 87°C
Evaporation rate	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. 0.026 (butyl acetate = 1)
Flammability (solid, gas)	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not applicable. Not applicable. Not applicable.
Upper/lower flammability or explosive limits	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. Lower: 2.6% Upper: 28.5%
Vapour pressure	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. 0.056 kPa [room temperature]
Vapour density	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. 2.7 [Air = 1]
Relative density	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. 1.1
Solubility(ies)	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Soluble in the following materials: cold water and hot water. Easily 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	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. -1.35
Auto-ignition temperature	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	Not available. Not available. 300 to 302°C

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 9: Physical and chemical properties

Decomposition temperature	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	140 to 189°C
Viscosity	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Dynamic (room temperature): 2.14 mPa·s
Explosive properties	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Not available.
Oxidising properties	: PfuTurbo Cx Hotstart DNA Polymerase	Not available.
	10X PfuTurbo Cx Reaction Buffer	Not available.
	DMSO	Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

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

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 10: Stability and reactivity

10.6 Hazardous decomposition products	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	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. Under normal conditions of storage and use, hazardous decomposition products should not be produced.
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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
PfuTurbo Cx Hotstart DNA Polymerase Poly(oxy-1,2-ethanediyl), . alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-. omega.-hydroxy-	LD50 Oral	Rat	2800 mg/kg	-
10X PfuTurbo Cx Reaction Buffer Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-
DMSO Dimethyl sulfoxide	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-

Acute toxicity estimates

Route	ATE value
10X PfuTurbo Cx Reaction Buffer Oral	180000 mg/kg

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
PfuTurbo Cx Hotstart DNA Polymerase Poly(oxy-1,2-ethanediyl), . alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-. omega.-hydroxy-	Eyes - Severe irritant	Rabbit	-	1%	-
10X PfuTurbo Cx Reaction Buffer Polyoxyethylene octyl phenyl ether	Eyes - Moderate irritant	Rabbit	-	24 hours 10 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 microliters	-
DMSO Dimethyl sulfoxide	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	100 milligrams	-

Sensitiser

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 11: Toxicological information

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
10X PfuTurbo Cx 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 : PfuTurbo Cx Hotstart DNA Polymerase Routes of entry anticipated: Oral, Dermal, Inhalation.
 10X PfuTurbo Cx Reaction Buffer Routes of entry anticipated: Oral, Dermal, Inhalation.
 DMSO Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Inhalation : PfuTurbo Cx Hotstart DNA Polymerase No known significant effects or critical hazards.
 10X PfuTurbo Cx Reaction Buffer No known significant effects or critical hazards.
 DMSO No known significant effects or critical hazards.

Ingestion : PfuTurbo Cx Hotstart DNA Polymerase No known significant effects or critical hazards.
 10X PfuTurbo Cx Reaction Buffer No known significant effects or critical hazards.
 DMSO No known significant effects or critical hazards.

Skin contact : PfuTurbo Cx Hotstart DNA Polymerase No known significant effects or critical hazards.
 10X PfuTurbo Cx Reaction Buffer No known significant effects or critical hazards.
 DMSO No known significant effects or critical hazards.

Eye contact : PfuTurbo Cx Hotstart DNA Polymerase No known significant effects or critical hazards.
 10X PfuTurbo Cx Reaction Buffer Causes serious eye irritation.
 DMSO No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation : PfuTurbo Cx Hotstart DNA Polymerase No specific data.
 10X PfuTurbo Cx Reaction Buffer No specific data.
 DMSO No specific data.

Ingestion : PfuTurbo Cx Hotstart DNA Polymerase No specific data.
 10X PfuTurbo Cx Reaction Buffer No specific data.
 DMSO No specific data.

Skin contact : PfuTurbo Cx Hotstart DNA Polymerase No specific data.
 10X PfuTurbo Cx Reaction Buffer No specific data.
 DMSO No specific data.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 11: Toxicological information

Eye contact	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer	No specific data. Adverse symptoms may include the following: pain or irritation watering redness
	DMSO	No specific data.

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	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Carcinogenicity	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Mutagenicity	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Teratogenicity	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Developmental effects	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
Fertility effects	: PfuTurbo Cx Hotstart DNA Polymerase 10X PfuTurbo Cx Reaction Buffer DMSO	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
PfuTurbo Cx 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 PfuTurbo Cx 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
DMSO Dimethyl sulfoxide	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 100 µl/L Marine water	Algae - Ulva lactuca	72 hours

12.2 Persistence and degradability

Not available.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
10X PfuTurbo Cx Reaction Buffer Polyoxyethylene octyl phenyl ether	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
PfuTurbo Cx Hotstart DNA Polymerase Poly(oxy-1,2-ethanediyl), . alpha.-[(1,1,3, 3-tetramethylbutyl)phenyl]-. omega.-hydroxy-	3.77	78.67	low
10X PfuTurbo Cx Reaction Buffer Polyoxyethylene octyl phenyl ether	4.86	-	high
DMSO Dimethyl sulfoxide	-1.35	3.16	low

12.4 Mobility in soil

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 12: Ecological information

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

Mobility : Not available.

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

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 15: Regulatory information

Ingredient name	Intrinsic property	Status	Reference number	Date of revision
PfuTurbo Cx 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 PfuTurbo Cx 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 : PfuTurbo Cx Hotstart DNA Polymerase Not applicable.
10X PfuTurbo Cx Reaction Buffer Not applicable.
DMSO Not applicable.

Other EU regulations

Industrial emissions (integrated pollution prevention and control) - Air : Listed

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.

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 15: Regulatory information

Philippines	: All components are listed or exempted.
Republic of Korea	: Not determined.
Taiwan	: All components are listed or exempted.
Thailand	: Not determined.
Turkey	: Not determined.
United States	: All components are listed or exempted.
Viet Nam	: Not determined.

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

Classification	Justification
10X PfuTurbo Cx Reaction Buffer Eye Irrit. 2, H319	Calculation method

Full text of abbreviated H statements

PfuTurbo Cx Hotstart DNA Polymerase H315 H318 H411	Causes skin irritation. Causes serious eye damage. Toxic to aquatic life with long lasting effects.
10X PfuTurbo Cx Reaction Buffer H302 H315 H318 H319 H335 H411	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.

Full text of classifications [CLP/GHS]

PfuTurbo Cx Hotstart DNA Polymerase Aquatic Chronic 2, H411 Eye Dam. 1, H318 Skin Irrit. 2, H315	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1 SKIN CORROSION/IRRITATION - Category 2
10X PfuTurbo Cx 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	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

Date of issue/ Date of revision : 21/06/2017

Date of previous issue : No previous validation.

Date of issue/Date of revision : 21/06/2017

PfuTurbo Cx Hotstart DNA Polymerase, Part Number 600410

SECTION 16: Other information

Version : 1

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