

SAFETY DATA SHEET



Pfu DNA Ligase, Part Number 600191

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

1.1 Product identifier

Product name : Pfu DNA Ligase, Part Number 600191
Part No. (Kit) : 600191
Part No. : Pfu DNA Ligase 600191-51
Pfu DNA Ligase 10X 600191-52
Buffer

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

Identified uses	
Analytical reagent. For Research Use Only. Not for use in diagnostic procedures.	
Pfu DNA Ligase	0.1 ml (400 U 4 U/μl)
Pfu DNA Ligase 10X Buffer	0.3 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 : Pfu DNA Ligase Mixture
Pfu DNA Ligase 10X Mixture
Buffer

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

Pfu DNA Ligase 10X Buffer
H319 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2

Ingredients of unknown toxicity : Pfu DNA Ligase Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 30 - 60%
Pfu DNA Ligase 10X 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%

Ingredients of unknown ecotoxicity : Pfu DNA Ligase 10X 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.


Date of issue/Date of revision : 23/01/2018

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SECTION 2: Hazards identification

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

2.2 Label elements

Hazard pictograms	: Pfu DNA Ligase 10X Buffer	
Signal word	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No signal word. Warning
Hazard statements	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. H319 - Causes serious eye irritation.
<u>Precautionary statements</u>		
Prevention	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. P280 - Wear eye or face protection. P264 - Wash hands thoroughly after handling.
Response	: Pfu DNA Ligase Pfu DNA Ligase 10X 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	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
Disposal	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
Hazardous ingredients	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
Supplemental label elements	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
<u>Special packaging requirements</u>		
Tactile warning of danger	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
2.3 Other hazards		
Other hazards which do not result in classification	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	None known. None known.

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SECTION 3: Composition/information on ingredients

3.1 Substances : Pfu DNA Ligase Mixture
Pfu DNA Ligase 10X Buffer Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
Pfu DNA Ligase Glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥50 - ≤75	Not classified.	[2]
Polyoxyethylene octyl phenyl ether	CAS: 9002-93-1	≤0.3	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Chronic 2, H411	[1] [5]
Pfu DNA Ligase 10X 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 See Section 16 for the full text of the H statements declared above.	[1] [5]

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	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	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. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. 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

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SECTION 4: First aid measures

		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	: Pfu DNA Ligase	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	No action shall be taken involving any personal risk or without suitable training.
	Pfu DNA Ligase 10X 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.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. Causes serious eye irritation.
Inhalation	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Skin contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Ingestion	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. Adverse symptoms may include the following:
		pain or irritation watering redness

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SECTION 4: First aid measures

Inhalation	:	Pfu DNA Ligase	No specific data.
		Pfu DNA Ligase 10X	No specific data.
		Buffer	
Skin contact	:	Pfu DNA Ligase	No specific data.
		Pfu DNA Ligase 10X	No specific data.
		Buffer	
Ingestion	:	Pfu DNA Ligase	No specific data.
		Pfu DNA Ligase 10X	No specific data.
		Buffer	

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	:	Pfu DNA Ligase	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.
		Pfu DNA Ligase 10X	
		Buffer	
Specific treatments	:	Pfu DNA Ligase	No specific treatment.
		Pfu DNA Ligase 10X	No specific treatment.
		Buffer	

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Pfu DNA Ligase	Use an extinguishing agent suitable for the surrounding fire.
		Pfu DNA Ligase 10X	Use an extinguishing agent suitable for the surrounding fire.
		Buffer	
Unsuitable extinguishing media	:	Pfu DNA Ligase	None known.
		Pfu DNA Ligase 10X	None known.
		Buffer	

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	:	Pfu DNA Ligase	In a fire or if heated, a pressure increase will occur and the container may burst.
		Pfu DNA Ligase 10X	In a fire or if heated, a pressure increase will occur and the container may burst.
		Buffer	
Hazardous combustion products	:	Pfu DNA Ligase	Decomposition products may include the following materials: carbon dioxide carbon monoxide
		Pfu DNA Ligase 10X	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds metal oxide/oxides
		Buffer	

5.3 Advice for firefighters

Special precautions for fire-fighters	:	Pfu DNA Ligase	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.
		Pfu DNA Ligase 10X	
		Buffer	

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SECTION 5: Firefighting measures

Special protective equipment for fire-fighters	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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".
	Pfu DNA Ligase 10X 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".
6.2 Environmental precautions	: Pfu DNA Ligase	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).
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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.

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SECTION 6: Accidental release measures

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

Protective measures	: Pfu DNA Ligase	Put on appropriate personal protective equipment (see Section 8).
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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	: Pfu DNA Ligase	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.
	Pfu DNA Ligase 10X 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.

7.3 Specific end use(s)

Recommendations	: Pfu DNA Ligase	Industrial applications, Professional applications.
	Pfu DNA Ligase 10X Buffer	Industrial applications, Professional applications.
Industrial sector specific solutions	: Pfu DNA Ligase	Not applicable.
	Pfu DNA Ligase 10X Buffer	Not applicable.

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
Pfu DNA Ligase 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: safety glasses with side-shields.

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.

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.

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SECTION 8: Exposure controls/personal protection

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	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Liquid. Liquid.
Colour	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Odour	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Odour threshold	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
pH	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	7.5 7.5
Melting point/freezing point	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Initial boiling point and boiling range	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Flash point	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Evaporation rate	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Flammability (solid, gas)	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not applicable. Not applicable.
Upper/lower flammability or explosive limits	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Vapour pressure	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Vapour density	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Relative density	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Solubility(ies)	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Soluble in the following materials: cold water and hot water. Easily soluble in the following materials: cold water and hot water.

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SECTION 9: Physical and chemical properties

Partition coefficient: n-octanol/water	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Auto-ignition temperature	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Decomposition temperature	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Viscosity	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Explosive properties	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.
Oxidising properties	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	Not available. Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

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

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Pfu DNA Ligase Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-
Pfu DNA Ligase 10X Buffer Polyoxyethylene octyl phenyl ether	LD50 Oral	Rat	1800 mg/kg	-

Acute toxicity estimates

Route	ATE value
Pfu DNA Ligase 10X Buffer Oral	181602 mg/kg

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Pfu DNA Ligase Polyoxyethylene octyl phenyl ether	Eyes - Moderate irritant	Rabbit	-	24 hours 10 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 microliters	-
Pfu DNA Ligase 10X Buffer Polyoxyethylene octyl phenyl ether	Eyes - Moderate irritant	Rabbit	-	24 hours 10 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 microliters	-

Sensitiser

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
Pfu DNA Ligase 10X 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

: Pfu DNA Ligase
Pfu DNA Ligase 10X Buffer

Routes of entry anticipated: Oral, Dermal, Inhalation.
Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Inhalation

: Pfu DNA Ligase
Pfu DNA Ligase 10X Buffer

No known significant effects or critical hazards.
No known significant effects or critical hazards.

Ingestion

: Pfu DNA Ligase
Pfu DNA Ligase 10X Buffer

No known significant effects or critical hazards.
No known significant effects or critical hazards.

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SECTION 11: Toxicological information

Skin contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Eye contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.
Ingestion	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.
Skin contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. No specific data.
Eye contact	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No specific data. Adverse symptoms may include the following: 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	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Carcinogenicity	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Mutagenicity	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Teratogenicity	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Developmental effects	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.
Fertility effects	: Pfu DNA Ligase Pfu DNA Ligase 10X Buffer	No known significant effects or critical hazards. No known significant effects or critical hazards.

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SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
Pfu DNA Ligase 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
Pfu DNA Ligase 10X 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
Pfu DNA Ligase Polyoxyethylene octyl phenyl ether	-	-	Readily
Pfu DNA Ligase 10X Buffer Polyoxyethylene octyl phenyl ether	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Pfu DNA Ligase Polyoxyethylene octyl phenyl ether	4.86	-	high
Pfu DNA Ligase 10X Buffer Polyoxyethylene octyl phenyl ether	4.86	-	high

12.4 Mobility in soil

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.

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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 : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

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. Empty containers or liners may retain some product residues. Avoid dispersal of spilt 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
Pfu DNA Ligase Polyoxyethylene octyl phenyl ether	Substance of equivalent concern for environment	Recommended	ED/169/2012	2/10/2014
Pfu DNA Ligase 10X 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 : Pfu DNA Ligase Not applicable.
Pfu DNA Ligase 10X Buffer Not applicable.

Pfu DNA Ligase, Part Number 600191

SECTION 15: Regulatory information

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	: Not determined.
Canada	: Not determined.
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	: Not determined.
Philippines	: Not determined.
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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Date of issue/Date of revision : 23/01/2018

15/16

Pfu DNA Ligase, Part Number 600191

SECTION 16: Other information

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

Classification	Justification
Pfu DNA Ligase 10X Buffer Eye Irrit. 2, H319	Calculation method

Full text of abbreviated H statements

<p>Pfu DNA Ligase H302 H315 H318 H411</p> <p>Pfu DNA Ligase 10X Buffer H302 H315 H318 H319 H335 H411</p>	<p>Harmful if swallowed. Causes skin irritation. Causes serious eye damage. Toxic to aquatic life with long lasting effects.</p> <p>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.</p>
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Full text of classifications [CLP/GHS]

<p>Pfu DNA Ligase Acute Tox. 4, H302 Aquatic Chronic 2, H411 Eye Dam. 1, H318 Skin Irrit. 2, H315</p> <p>Pfu DNA Ligase 10X 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</p>	<p>ACUTE TOXICITY (oral) - Category 4 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1 SKIN CORROSION/IRRITATION - Category 2</p> <p>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</p>
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Version : 2

Notice to reader

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