Section 1. Identification

Product identifier : PfuUltra II Fusion HS DNA Polymerase, Part Number 930674
Part No. (Chemical Kit) : 930674
Part No. : PfuUltra II Fusion HS DNA Polymerase 930674-51
10X PfuUltra II Reaction Buffer 930674-52

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

Analytical reagent.

PfuUltra II Fusion HS DNA Polymerase 3 x 1.67 ml
10X PfuUltra II Reaction Buffer 10 ml

Supplier/Manufacturer : Agilent Technologies Australia Pty Ltd
679 Springvale Road
Mulgrave
Victoria 3170, Australia
1800 802 402

Emergency telephone number (with hours of operation) : CHEMTREC®: (61)-290372994

Section 2. Hazard(s) identification

Classification of the substance or mixture
10X PfuUltra II Reaction Buffer
H319
SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A
10X PfuUltra II Reaction Buffer Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 3.4%
10X PfuUltra II Reaction Buffer Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3.4%

GHS label elements

Hazard pictograms : 

Signal word : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer No signal word.

Hazard statements : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

H319 - Causes serious eye irritation.

Precautionary statements

Prevention : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer Not applicable.

P280 - Wear eye or face protection.
P264 - Wash hands thoroughly after handling.

Date of issue/Date of revision : 26/10/2016
Date of previous issue : No previous validation.
Version : 1
Section 2. Hazard(s) identification

Response: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Response: P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical attention.

Storage: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Storage: Not applicable.

Disposal: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Disposal: Not applicable.

Supplemental label elements: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Supplemental label elements: Not applicable.

Other hazards which do not result in classification: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Other hazards which do not result in classification: None known.

Section 3. Composition and ingredient information

Substance/mixture: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Substance/mixture: Mixture

CAS number/other identifiers

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>% (w/w)</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuUltra II Fusion HS DNA Polymerase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>≥30 - ≤60</td>
<td>56-81-5</td>
</tr>
<tr>
<td>10X PfuUltra II Reaction Buffer</td>
<td>&lt;2.5</td>
<td>9002-93-1</td>
</tr>
</tbody>
</table>

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.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Eye contact: 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.

Eye contact: 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.
Section 4. First aid measures

**Inhalation**

- **PfuUltra II Fusion HS 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 II 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 II Fusion HS DNA Polymerase**
  - Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

- **10X PfuUltra II 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 II Fusion HS 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 II 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.

**Most important symptoms/effects, acute and delayed**

**Potential acute health effects**

**Eye contact**

- **PfuUltra II Fusion HS DNA Polymerase**
  - No known significant effects or critical hazards.

- **10X PfuUltra II Reaction Buffer**
  - Causes serious eye irritation.

**Inhalation**

- **PfuUltra II Fusion HS DNA Polymerase**
  - No known significant effects or critical hazards.

- **10X PfuUltra II Reaction Buffer**
  - No known significant effects or critical hazards.
Section 4. First aid measures

### Skin contact
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No known significant effects or critical hazards.

### Ingestion
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No known significant effects or critical hazards.

### Over-exposure signs/symptoms

#### Eye contact
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - Adverse symptoms may include the following:
    - pain or irritation
    - watering
    - redness
  - No specific data.

#### Inhalation
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No specific data.

#### Skin contact
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No specific data.

#### Ingestion
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No specific data.

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

#### Notes to physician
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II 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 II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No specific treatment.

#### Protection of first-aiders
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Firefighting measures

### Extinguishing media

#### Suitable extinguishing media
- **PfuUltra II Fusion HS DNA Polymerase**
- **10X PfuUltra II Reaction Buffer**
  - Use an extinguishing agent suitable for the surrounding fire.
Section 5. Firefighting measures

Unsuitable extinguishing media: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

None known.

Specific hazards arising from the chemical: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer

Decomposition products may include the following materials:
- carbon dioxide
- carbon monoxide
- nitrogen oxides
- sulfur oxides
- metal oxides

In a fire or if heated, a pressure increase will occur and the container may burst.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special protective actions for fire-fighters:

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:

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.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel: PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II 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. Put on appropriate personal protective equipment.

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Date of previous issue: No previous validation
Version: 1
5/14
Section 6. Accidental release measures

For emergency responders:

- **PfuUltra II Fusion HS 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 II 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".

Environmental precautions:

- **PfuUltra II Fusion HS 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 II 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).

Methods and material for containment and cleaning up:

**Methods for cleaning up**:

- **PfuUltra II Fusion HS 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 II Reaction Buffer**
  - Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

**Precautions for safe handling**

**Protective measures**:

- **PfuUltra II Fusion HS DNA Polymerase**
  - Put on appropriate personal protective equipment (see Section 8).

- **10X PfuUltra II 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 II Fusion HS 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 II 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.
Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities

- **PfuUltra II Fusion HS 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.

- **10X PfuUltra II 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.

Section 8. Exposure controls and personal protection

**Ingredient name** | **Exposure limits**
--- | ---
**PfuUltra II Fusion HS DNA Polymerase** | Safe Work Australia (Australia, 1/2014). TWA: 10 mg/m³ 8 hours.
**Glycerol** | Safe Work Australia (Australia, 1/2014). TWA: 10 mg/m³ 8 hours.

**Appropriate engineering controls**

- Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

**Environmental exposure controls**

- Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**

**Hygiene measures**

- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection**

- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

**Skin protection**

- 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.
Section 8. Exposure controls and personal protection

**Body protection**: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection**: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection**: Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

**Appearance**

**Physical state**: PfuUltra II Fusion HS DNA Polymerase Liquid.

**10X PfuUltra II Reaction Buffer** Liquid.

**Colour**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Odour**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Odour threshold**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**pH**: PfuUltra II Fusion HS DNA Polymerase 8

10X PfuUltra II Reaction Buffer 10

**Melting point**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Boiling point**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Flash point**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Evaporation rate**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.

**Flammability (solid, gas)**: PfuUltra II Fusion HS DNA Polymerase Not applicable.

10X PfuUltra II Reaction Buffer Not applicable.

**Lower and upper explosive (flammable) limits**: PfuUltra II Fusion HS DNA Polymerase Not available.

10X PfuUltra II Reaction Buffer Not available.
## Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>PfuUltra II Fusion HS DNA Polymerase</th>
<th>10X PfuUltra II Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vapour pressure</strong></td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Vapour density</strong></td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Relative density</strong></td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Solubility</strong></td>
<td>Soluble in the following materials: cold water and hot water.</td>
<td>Easily soluble in the following materials: cold water and hot water.</td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature</strong></td>
<td>Not available.</td>
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</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>Not available.</td>
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</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>Not available.</td>
<td>Not available.</td>
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</tbody>
</table>

## Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>PfuUltra II Fusion HS DNA Polymerase</th>
<th>10X PfuUltra II Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reactivity</strong></td>
<td>No specific test data related to reactivity available for this product or its ingredients.</td>
<td>No specific test data related to reactivity available for this product or its ingredients.</td>
</tr>
<tr>
<td><strong>Chemical stability</strong></td>
<td>The product is stable.</td>
<td>The product is stable.</td>
</tr>
<tr>
<td><strong>Possibility of hazardous reactions</strong></td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
</tr>
<tr>
<td><strong>Conditions to avoid</strong></td>
<td>No specific data.</td>
<td>No specific data.</td>
</tr>
<tr>
<td><strong>Incompatible materials</strong></td>
<td>May react or be incompatible with oxidising materials.</td>
<td>May react or be incompatible with oxidising materials.</td>
</tr>
</tbody>
</table>
Section 10. Stability and reactivity

Hazardous decomposition products: PfuUltra II Fusion HS DNA Polymerase
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

10X PfuUltra II Reaction Buffer
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuUltra II Fusion HS DNA Polymerase Glycerol</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>12600 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuUltra II Fusion HS DNA Polymerase Glycerol</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>10X PfuUltra II Reaction Buffer Polyoxyethylene octyl phenyl ether</td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 10 microliters</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 microliters</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensitisation
Not available.

Mutagenicity
Not available.

Carcinogenicity
Not available.

Reproductive toxicity
Not available.

Teratogenicity
Not available.

Specific target organ toxicity (single exposure)
Not available.

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on likely routes of exposure: PfuUltra II Fusion HS DNA Polymerase
Routes of entry anticipated: Oral, Dermal, Inhalation.

10X PfuUltra II Reaction Buffer
Routes of entry anticipated: Oral, Dermal, Inhalation.
Section 11. Toxicological information

Potential acute health effects

**Eye contact**
- PfuUltra II Fusion HS DNA Polymerase: No known significant effects or critical hazards.
- 10X PfuUltra II Reaction Buffer: Causes serious eye irritation.

**Inhalation**
- PfuUltra II Fusion HS DNA Polymerase: No known significant effects or critical hazards.
- 10X PfuUltra II Reaction Buffer: No known significant effects or critical hazards.

**Skin contact**
- PfuUltra II Fusion HS DNA Polymerase: No known significant effects or critical hazards.
- 10X PfuUltra II Reaction Buffer: No known significant effects or critical hazards.

**Ingestion**
- PfuUltra II Fusion HS DNA Polymerase: No known significant effects or critical hazards.
- 10X PfuUltra II Reaction Buffer: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact**
- PfuUltra II Fusion HS DNA Polymerase: No specific data.
- 10X PfuUltra II Reaction Buffer: Adverse symptoms may include the following:
  - pain or irritation
  - watering
  - redness

**Inhalation**
- PfuUltra II Fusion HS DNA Polymerase: No specific data.
- 10X PfuUltra II Reaction Buffer: No specific data.

**Skin contact**
- PfuUltra II Fusion HS DNA Polymerase: No specific data.
- 10X PfuUltra II Reaction Buffer: No specific data.

**Ingestion**
- PfuUltra II Fusion HS DNA Polymerase: No specific data.
- 10X PfuUltra II Reaction Buffer: 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**
Not available.

- **General**: PfuUltra II Fusion HS DNA Polymerase: No known significant effects or critical hazards.
- 10X PfuUltra II Reaction Buffer: No known significant effects or critical hazards.
Section 11. Toxicological information

Carcinogenicity: PfuUltra II Fusion HS DNA Polymerase No known significant effects or critical hazards.
10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

Mutagenicity: PfuUltra II Fusion HS DNA Polymerase No known significant effects or critical hazards.
10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

Teratogenicity: PfuUltra II Fusion HS DNA Polymerase No known significant effects or critical hazards.
10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

Developmental effects: PfuUltra II Fusion HS DNA Polymerase No known significant effects or critical hazards.
10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

Fertility effects: PfuUltra II Fusion HS DNA Polymerase No known significant effects or critical hazards.
10X PfuUltra II Reaction Buffer No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10X PfuUltra II Reaction Buffer Oral</td>
<td>50000 mg/kg</td>
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</tbody>
</table>

Section 12. Ecological information

Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuUltra II Fusion HS DNA Polymerase Glycerol</td>
<td>Acute LC50 54000 mg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
<tr>
<td>10X PfuUltra II Reaction Buffer Polyoxethylene octyl phenyl ether</td>
<td>Acute LC50 5.85 mg/l Fresh water</td>
<td>Crustaceans - Ceriodaphnia rigaudi - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 11.2 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 4500 μg/l Fresh water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

Persistence and degradability

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Aquatic half-life</th>
<th>Photolysis</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>10X PfuUltra II Reaction Buffer Polyoxylene octyl phenyl ether</td>
<td>-</td>
<td>-</td>
<td>Readily</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

Date of issue/Date of revision : 26/10/2016  Date of previous issue : No previous validation.  Version : 1  12/14
Section 12. Ecological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuUltra II Fusion HS DNA Polymerase</td>
<td>-1.76</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Glycerol</td>
<td>-1.76</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>10X PfuUltra II Reaction Buffer</td>
<td>4.86</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>4.86</td>
<td>-</td>
<td>high</td>
</tr>
</tbody>
</table>

**Mobility in soil**
- Soil/water partition coefficient (K_{OC}): Not available.

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

Section 13. Disposal considerations

**Disposal methods**: 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. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

**Regulatory information**
- **ADG / IMDG / IATA**: Not regulated as Dangerous Goods according to the ADG Code.

**Special precautions for user**: Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of Marpol and the IBC Code**: Not available.

Section 15. Regulatory information

**Standard Uniform Schedule of Medicine and Poisons**
- Not regulated.

**Model Work Health and Safety Regulations - Scheduled Substances**
- No listed substance

**Australia inventory (AICS)**: Not determined.

**International regulations**
- **Chemical Weapon Convention List Schedules I, II & III Chemicals**: Not listed.

- **Montreal Protocol (Annexes A, B, C, E)**
- Not listed.

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Section 15. Regulatory information

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.

International lists
National inventory
Canada : Not determined.
China : Not determined.
Europe : All components are listed or exempted.
Japan : Japan inventory (ENCS): All components are listed or exempted.
        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.
Turkey : Not determined.
United States : All components are listed or exempted.

Section 16. Any other relevant information

History
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Date of previous issue : No previous validation.
Version : 1
Key to abbreviations : ADG = Australian Dangerous Goods
                     ATE = Acute Toxicity Estimate
                     BCF = Bioconcentration Factor
                     GHS = Globally Harmonized System of Classification and Labelling of Chemicals
                     IATA = International Air Transport Association
                     IBC = Intermediate Bulk Container
                     IMDG = International Maritime Dangerous Goods
                     LogPow = logarithm of the octanol/water partition coefficient
                     NOHSC = National Occupational Health and Safety Commission
                     SUSMP = Standard Uniform Schedule of Medicine and Poisons
                     UN = United Nations

Procedure used to derive the classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>10X PfuUltra II Reaction Buffer</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Eye Irrit. 2A, H319</td>
<td></td>
</tr>
</tbody>
</table>

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

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