Section 1. Identification

1.1 Product identifier

Product name: PfuTurbo Hotstart DNA Polymerase, Part Number 600324
Part No. (Chemical Kit): 600324
Part No.: PfuTurbo Hotstart DNA polymerase 600324-51
10X Cloned Pfu Reaction Buffer 600153-82
Validation date: 5/31/2017

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

Material uses: Analytical reagent.

PfuTurbo Hotstart DNA polymerase 0.4 ml (1000 U 2.5 U/µl)
10X Cloned Pfu Reaction Buffer 4 x 1 ml

1.3 Details of the supplier of the safety data sheet

Supplier/Manufacturer: Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

1.4 Emergency telephone number

In case of emergency: CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status: PfuTurbo Hotstart DNA polymerase
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
10X Cloned Pfu Reaction Buffer
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

PfuTurbo Hotstart DNA polymerase
H320 EYE IRRITATION - Category 2B

10X Cloned Pfu Reaction Buffer
H319 EYE IRRITATION - Category 2A

Ingredients of unknown toxicity: PfuTurbo Hotstart DNA polymerase
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 oral toxicity: 1 - 10%
10X Cloned Pfu Reaction Buffer

2.2 GHS label elements
Section 2. Hazards identification

Hazard pictograms : 10X Cloned Pfu Reaction Buffer

Signal word : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
Warning

Hazard statements : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
H320 - Causes eye irritation.

Precautionary statements

Prevention : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
P264 - Wash hands thoroughly after handling.

Response : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

Storage : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
Not applicable.

Disposal : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
Not applicable.

Supplemental label elements : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
None known.

2.3 Other hazards

Hazard not otherwise classified : PfuTurbo Hotstart DNA polymerase
10X Cloned Pfu Reaction Buffer
None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>≥50 - ≤75</td>
<td>56-81-5</td>
</tr>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride</td>
<td>≤5</td>
<td>1185-53-1</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>≤3</td>
<td>7783-20-2</td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>≤2.3</td>
<td>9002-93-1</td>
</tr>
</tbody>
</table>

Date of issue : 05/31/2017
Section 3. Composition/information on ingredients

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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

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

Section 4. First aid measures

4.1 Description of necessary first aid measures

<table>
<thead>
<tr>
<th>Eye contact</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inhalation</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skin contact</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>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.</td>
</tr>
</tbody>
</table>
Section 4. First aid measures

**Ingestion**: PfuTurbo Hotstart DNA polymerase
Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

10X Cloned Pfu Reaction Buffer
Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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

**Potential acute health effects**

- **Eye contact**: PfuTurbo Hotstart DNA polymerase
  Causes eye irritation.
  10X Cloned Pfu Reaction Buffer
  Causes serious eye irritation.

- **Inhalation**: PfuTurbo Hotstart DNA polymerase
  No known significant effects or critical hazards.
  10X Cloned Pfu Reaction Buffer
  No known significant effects or critical hazards.

- **Skin contact**: PfuTurbo Hotstart DNA polymerase
  No known significant effects or critical hazards.
  10X Cloned Pfu Reaction Buffer
  No known significant effects or critical hazards.

- **Ingestion**: PfuTurbo Hotstart DNA polymerase
  No known significant effects or critical hazards.
  10X Cloned Pfu Reaction Buffer
  No known significant effects or critical hazards.

**Over-exposure signs/symptoms**

- **Eye contact**: PfuTurbo Hotstart DNA polymerase
  Adverse symptoms may include the following:
  - irritation
  - watering
  - redness
  10X Cloned Pfu Reaction Buffer
  Adverse symptoms may include the following:
  - pain or irritation
  - watering
  - redness

**Date of issue**: 05/31/2017
# Section 4. First aid measures

<table>
<thead>
<tr>
<th>Route of exposure</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>No specific data.</td>
<td>No specific data.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>No specific data.</td>
<td>No specific data.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>No specific data.</td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

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

**Notes to physician**

- **PfuTurbo Hotstart DNA polymerase**: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- **10X Cloned Pfu Reaction Buffer**: 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**

- **PfuTurbo Hotstart DNA polymerase**: No specific treatment.
- **10X Cloned Pfu Reaction Buffer**: No specific treatment.

**Protection of first-aiders**

- **PfuTurbo Hotstart DNA polymerase**: 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.
- **10X Cloned Pfu 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.

See toxicological information (Section 11)

# Section 5. Fire-fighting measures

## 5.1 Extinguishing media

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsuitable extinguishing media</td>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td>10X Cloned Pfu Reaction Buffer</td>
</tr>
</tbody>
</table>

Use an extinguishing agent suitable for the surrounding fire.

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsuitable extinguishing media</td>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td>10X Cloned Pfu Reaction Buffer</td>
</tr>
</tbody>
</table>

None known.

## 5.2 Special hazards arising from the substance or mixture

<table>
<thead>
<tr>
<th>Specific hazards arising from the chemical</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous thermal decomposition products</td>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td>10X Cloned Pfu Reaction Buffer</td>
</tr>
</tbody>
</table>

Decomposition products may include the following materials:
- Carbon dioxide
- Carbon monoxide

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

Decomposition products may include the following materials:
- Carbon dioxide
Section 5. Fire-fighting measures

5.3 Advice for firefighters

Special protective actions for fire-fighters:
- PFuTurbo 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 Cloned Pfu Reaction Buffer

Special protective equipment for fire-fighters:
- PFuTurbo Hotstart DNA polymerase

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

10X Cloned Pfu Reaction Buffer

Section 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:
- PFuTurbo Hotstart DNA polymerase

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

10X Cloned Pfu Reaction Buffer

For emergency responders:
- PFuTurbo Hotstart DNA polymerase

If specialized 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 Cloned Pfu Reaction Buffer
Section 6. Accidental release measures

6.2 Environmental precautions

<table>
<thead>
<tr>
<th>Precautions</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spilled material and runoff</td>
<td>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).</td>
<td>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).</td>
</tr>
</tbody>
</table>

10X Cloned Pfu Reaction Buffer

<table>
<thead>
<tr>
<th>Precautions</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

10X Cloned Pfu Reaction Buffer

Section 7. Handling and storage

7.1 Precautions for safe handling

<table>
<thead>
<tr>
<th>Protective measures</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.</td>
<td>Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.</td>
<td></td>
</tr>
</tbody>
</table>

10X Cloned Pfu Reaction Buffer

<table>
<thead>
<tr>
<th>Advice on general occupational hygiene</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

10X Cloned Pfu Reaction Buffer

Date of issue: 05/31/2017
Section 7. Handling and storage

7.2 Conditions for safe storage, including any incompatibilities

- **PfuTurbo Hotstart DNA polymerase**
  Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

- **10X Cloned Pfu Reaction Buffer**
  Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

- **Recommendations**
  - **Industrial sector specific solutions**
    - **PfuTurbo Hotstart DNA polymerase**
      Industrial applications, Professional applications.
    - **10X Cloned Pfu Reaction Buffer**
      Industrial applications, Professional applications.

- **Industrial applications**
  - **PfuTurbo Hotstart DNA polymerase**
  - **10X Cloned Pfu Reaction Buffer**

- **Professional applications**
  - **PfuTurbo Hotstart DNA polymerase**
  - **10X Cloned Pfu Reaction Buffer**

Section 8. Exposure controls/personal protection

8.1 Control parameters

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PfuTurbo Hotstart DNA polymerase</strong></td>
<td>OSHA PEL 1989 (United States, 3/1989). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 10 mg/m³ 8 hours. Form: Total dust</td>
</tr>
<tr>
<td><strong>Glycerol</strong></td>
<td>OSHA PEL (United States, 6/2016). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust</td>
</tr>
<tr>
<td><strong>10X Cloned Pfu Reaction Buffer</strong></td>
<td>None. None. None.</td>
</tr>
<tr>
<td><strong>2-Amino-2-(hydroxymethyl)propane-1,3-diol hydrochloride</strong></td>
<td>None. None. None.</td>
</tr>
<tr>
<td><strong>Ammonium sulphate</strong></td>
<td>None. None. None.</td>
</tr>
<tr>
<td><strong>Polyoxyethylene octyl phenyl ether</strong></td>
<td>None. None. None.</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

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

Date of issue: 05/31/2017
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.

Individual protection measures

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

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

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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

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

9.1 Information on basic physical and chemical properties

Appearance

10X Cloned Pfu Reaction Buffer: Liquid.

Color: PfuTurbo Hotstart DNA polymerase: Not available.
10X Cloned Pfu Reaction Buffer: Not available.

Odor: PfuTurbo Hotstart DNA polymerase: Not available.
10X Cloned Pfu Reaction Buffer: Not available.

Odor threshold: PfuTurbo Hotstart DNA polymerase: Not available.
10X Cloned Pfu Reaction Buffer: Not available.

pH: PfuTurbo Hotstart DNA polymerase: 8.2
10X Cloned Pfu Reaction Buffer: 8.8

Date of issue: 05/31/2017
## Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Lower and upper explosive (flammable) limits</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility</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>Partition coefficient: n-octanol/water</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

## Section 10. Stability and reactivity

### 10.1 Reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>
</tbody>
</table>

### 10.2 Chemical stability

<table>
<thead>
<tr>
<th>Property</th>
<th>PfuTurbo Hotstart DNA polymerase</th>
<th>10X Cloned Pfu Reaction Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The product is stable.</td>
<td>The product is stable.</td>
</tr>
</tbody>
</table>

**Date of issue**: 05/31/2017
Section 10. Stability and reactivity

10.3 Possibility of hazardous reactions:
- Under normal conditions of storage and use, PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer will not produce hazardous reactions.

10.4 Conditions to avoid:
- No specific data.

10.5 Incompatible materials:
- May react or be incompatible with oxidizing materials.

10.6 Hazardous decomposition products:
- Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

<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>Glycerol</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>12600 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2840 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Ammonium sulphate Polyoxyethylene octyl phenyl ether</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>1800 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>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 Cloned Pfu Reaction Buffer</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>

Sensitization
- Not available.

Mutagenicity
- Not available.

Date of issue: 05/31/2017
Section 11. Toxicological information

Not available.

Carcinogenicity
Not available.

Reproductive toxicity
Not available.

Teratogenicity
Not available.

Specific target organ toxicity (single exposure)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Respiratory tract irritation</td>
</tr>
</tbody>
</table>

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure:
PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer causes eye irritation.

Inhalation: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer causes serious eye irritation.

Skin contact: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer no known significant effects or critical hazards.

Ingestion: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer no known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer adverse symptoms may include the following: irritation, watering, redness.

Inhalation: PfuTurbo Hotstart DNA polymerase and 10X Cloned Pfu Reaction Buffer no specific data.
Section 11. Toxicological information

**Skin contact**:

- **PfuTurbo Hotstart DNA polymerase**: No specific data.
- **10X Cloned Pfu Reaction Buffer**: No specific data.

**Ingestion**:

- **PfuTurbo Hotstart DNA polymerase**: No specific data.
- **10X Cloned Pfu Reaction Buffer**: No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

- **Potential immediate effects**: Not available.
- **Potential delayed effects**: Not available.

#### Long term exposure

- **Potential immediate effects**: Not available.
- **Potential delayed effects**: Not available.

### Potential chronic health effects

- **General**: No known significant effects or critical hazards.
- **Carcinogenicity**: No known significant effects or critical hazards.
- **Mutagenicity**: No known significant effects or critical hazards.
- **Teratogenicity**: No known significant effects or critical hazards.
- **Developmental effects**: No known significant effects or critical hazards.
- **Fertility effects**: 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 Cloned Pfu Reaction Buffer</td>
<td>98687.3 mg/kg</td>
</tr>
</tbody>
</table>

**Date of issue**: 05/31/2017
## Section 12. Ecological information

### 12.1 Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td>Acute LC50 54000 mg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
<tr>
<td>Glycerol</td>
<td>Acute LC50 2.6 mg/l Fresh water</td>
<td>Crustaceans - Ceriodaphnia dubia - Young</td>
<td>48 hours</td>
</tr>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>Acute LC50 14000 to 15000 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Young</td>
<td>48 hours</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>Acute LC50 68 µg/l Fresh water</td>
<td>Fish - Oncorhynchus gorbuscha - Alevin</td>
<td>96 hours</td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>Chronic NOEC 7.5 mg/l Marine water</td>
<td>Algae - Phaeodactylum tricornutum - Exponential growth phase</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 143 µg/l Marine water</td>
<td>Fish - Salmo salar - Post-smolt</td>
<td>5 weeks</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 5.85 mg/l Fresh water</td>
<td>Crustaceans - Ceriodaphnia rigauidi - 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>

### 12.2 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 Cloned Pfu Reaction Buffer</td>
<td>-</td>
<td>-</td>
<td>Readily</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>-</td>
<td>-</td>
<td>Readily</td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>$\text{Log}_{\text{P}}$</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td>-1.76</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Glycerol</td>
<td>-</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>-5.1</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>4.86</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 12.4 Mobility in soil

| Soil/water partition coefficient ($K_{\text{OC}}$) | Not available. |

### 12.5 Other adverse effects

| : | No known significant effects or critical hazards. |
Section 13. Disposal considerations

13.1 Waste treatment methods

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

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

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

Section 14. Transport information

DOT / TDG / Mexico / IMDG / IATA: Not regulated.

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

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations: TSCA 8(a) PAIR: Poly(oxy-1,2-ethanediyl), .alpha.-[(1,1,3,3-tetramethylbutyl)phenyl]-omega.-hydroxy-; Polyoxethylene octyl phenyl ether

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

Clean Water Act (CWA) 311: Edetic acid

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Not listed

Clean Air Act Section 602 Class I Substances: Not listed

Clean Air Act Section 602 Class II Substances: Not listed

DEA List I Chemicals (Precursor Chemicals): Not listed

Date of issue: 05/31/2017
Section 15. Regulatory information

DEA List II Chemicals (Essential Chemicals)  : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ  : Not applicable.

SARA 311/312

Classification  : PfuTurbo Hotstart DNA polymerase

Immediate (acute) health hazard

10X Cloned Pfu Reaction Buffer  : Immediate (acute) health hazard

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>PfuTurbo Hotstart DNA polymerase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10X Cloned Pfu Reaction Buffer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-diol hydrochloride</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyoxyethylene octyl phenyl ether</td>
<td>≤2.3</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
</tbody>
</table>

SARA 313

<table>
<thead>
<tr>
<th>Form R - Reporting requirements</th>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier notification</td>
<td>10X Cloned Pfu Reaction Buffer</td>
<td>7783-20-2</td>
<td>≤3</td>
</tr>
<tr>
<td></td>
<td>Ammonium sulphate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts  : The following components are listed: GLYCERINE MIST

New York  : None of the components are listed.

New Jersey  : The following components are listed: GLYCERIN; 1,2,3-PROPANETRIOL

Pennsylvania  : The following components are listed: 1,2,3-PROPANETRIOL

California Prop. 65  : Not available.

International regulations


Date of issue : 05/31/2017
Section 15. Regulatory information

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**: Not determined.
- **Europe**: All components are listed or exempted.
- **Japan**: Japan inventory (ENCS): Not determined.
  Japan inventory (ISHL): Not determined.
- **Malaysia**: Not determined.
- **New Zealand**: All components are listed or exempted.
- **Philippines**: Not determined.
- **Republic of Korea**: Not determined.
- **Taiwan**: All components are listed or exempted.
- **Thailand**: Not determined.
- **Turkey**: Not determined.
- **United States**: Not determined.
- **Viet Nam**: Not determined.

Section 16. Other information

**History**

- **Date of issue**: 05/31/2017
- **Date of previous issue**: 01/30/2015
- **Version**: 4

▶ Indicates information that has changed from previously issued version.

**Notice to reader**

Disclaimer: The information contained in this document is based on Agilent’s state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.