

SAFETY DATA SHEET



PfuUltra II Fusion HS DNA Polymerase, Part Number 600672

Section 1. Identification

1.1 Product identifier

Product name : PfuUltra II Fusion HS DNA Polymerase, Part Number 600672
Part No. (Chemical Kit) : 600672
Part No. : PfuUltra II Fusion HS DNA Polymerase 600672-51
 10X PfuUltra II Reaction Buffer 600670-52
Validation date : 4/28/2017

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

Material uses : Analytical reagent.
 PfuUltra II Fusion HS DNA Polymerase 0.2 ml (200 reactions)
 10X PfuUltra II Reaction Buffer 2 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 : PfuUltra II Fusion HS DNA Polymerase This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
 10X PfuUltra II Reaction Buffer This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

PfuUltra II Fusion HS DNA Polymerase
 H320 EYE IRRITATION - Category 2B

10X PfuUltra II Reaction Buffer
 H319 EYE IRRITATION - Category 2A

Ingredients of unknown toxicity : 10X PfuUltra II Reaction Buffer Percentage of the mixture consisting of ingredient (s) of unknown toxicity: 3.4%

2.2 GHS label elements

Hazard pictograms :

Signal word : PfuUltra II Fusion HS DNA Polymerase Warning
 10X PfuUltra II Reaction Buffer Warning

Hazard statements :

Section 2. Hazards identification

| | |
|--------------------------------------|--|
| PfuUltra II Fusion HS DNA Polymerase | H320 - Causes eye irritation. |
| 10X PfuUltra II Reaction Buffer | GHS SYMBOL - Exclamation mark - H319 - Causes serious eye irritation. |

Precautionary statements

| | | |
|------------------------------------|---|--|
| Prevention | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | P264 - Wash hands thoroughly after handling. P280 - Wear eye or face protection. P264 - Wash hands thoroughly after handling. |
| Response | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II 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. 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 | Not applicable. Not applicable. |
| Disposal | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | Not applicable. Not applicable. |
| Supplemental label elements | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | None known. None known. |

2.3 Other hazards

| | | |
|---|---|----------------------------|
| Hazards not otherwise classified | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | None known. None known. |
|---|---|----------------------------|

Section 3. Composition/information on ingredients

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

| Ingredient name | % | CAS number |
|---|-----------|------------|
| PfuUltra II Fusion HS DNA Polymerase | | |
| Glycerol | ≥50 - ≤75 | 56-81-5 |
| 10X PfuUltra II Reaction Buffer | | |
| Trometamol | ≤3 | 77-86-1 |
| Ammonium sulphate | ≤3 | 7783-20-2 |
| Polyoxyethylene octyl phenyl ether | ≤2.9 | 9002-93-1 |

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

| | | |
|---------------------|--|--|
| Eye contact | : PfuUltra II Fusion HS DNA Polymerase | 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. |
| | 10X PfuUltra II Reaction Buffer | Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention. |
| Inhalation | : PfuUltra II Fusion HS DNA Polymerase | 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. |
| | 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. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| | 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 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 |

Section 4. First aid measures

| | |
|---------------------------------|---|
| | 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 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. |

4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

| | | |
|---------------------|---|--|
| Eye contact | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | Causes eye irritation. Causes serious eye irritation. |
| Inhalation | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | No known significant effects or critical hazards. No known significant effects or critical hazards. |
| Skin contact | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | No known significant effects or critical hazards. 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. 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: irritation watering redness Adverse symptoms may include the following: pain or irritation watering redness |
| Inhalation | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | No specific data. No specific data. |
| Skin contact | : PfuUltra II Fusion HS DNA Polymerase 10X PfuUltra II Reaction Buffer | No specific data. No specific data. |

Section 4. First aid measures

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

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

| | | |
|-----------------------------------|---|--|
| Notes to physician | : PfuUltra II Fusion HS DNA Polymerase | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| | 10X PfuUltra II 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 | : PfuUltra II Fusion HS DNA Polymerase | No specific treatment. |
| | 10X PfuUltra II Reaction Buffer | No specific treatment. |
| Protection of first-aiders | : PfuUltra II Fusion HS 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 PfuUltra II 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

| | | |
|---------------------------------------|---|---|
| Suitable extinguishing media | : PfuUltra II Fusion HS DNA Polymerase | Use an extinguishing agent suitable for the surrounding fire. |
| | 10X PfuUltra II Reaction Buffer | Use an extinguishing agent suitable for the surrounding fire. |
| Unsuitable extinguishing media | : PfuUltra II Fusion HS DNA Polymerase | None known. |
| | 10X PfuUltra II Reaction Buffer | None known. |

5.2 Special hazards arising from the substance or mixture

| | | |
|---|---|--|
| Specific hazards arising from the chemical | : PfuUltra II Fusion HS DNA Polymerase | In a fire or if heated, a pressure increase will occur and the container may burst. |
| | 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 | Decomposition products may include the following materials: carbon dioxide carbon monoxide |
| | 10X PfuUltra II Reaction Buffer | Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides metal oxide/oxides |

5.3 Advice for firefighters

Section 5. Fire-fighting measures

| | | |
|---|--|---|
| Special protective actions for fire-fighters | : PfuUltra II Fusion HS DNA Polymerase | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. |
| | 10X PfuUltra II Reaction Buffer | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. |
| Special protective equipment for fire-fighters | : PfuUltra II Fusion HS 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 PfuUltra II Reaction Buffer | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |

Section 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

| | | |
|------------------------------------|--|--|
| For non-emergency personnel | : PfuUltra II Fusion HS 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 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 spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. |
| For emergency responders | : PfuUltra II Fusion HS 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 PfuUltra II Reaction Buffer | 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". |

6.2 Environmental precautions

| | |
|--|---|
| : PfuUltra II Fusion HS DNA Polymerase | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). |
| 10X PfuUltra II Reaction Buffer | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). |

Section 6. Accidental release measures

6.3 Methods and materials 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

7.1 Precautions for safe handling

| | | |
|---|--|---|
| Protective measures | : PfuUltra II Fusion HS DNA Polymerase | 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. |
| | 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 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. |
| 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. |

7.2 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. |
|--|--|

Section 7. Handling and storage

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 unlabeled containers. Use appropriate containment to avoid environmental contamination.

7.3 Specific end use(s)

| | | |
|---|--|---|
| Recommendations | : PfuUltra II Fusion HS DNA Polymerase | Industrial applications, Professional applications. |
| | : 10X PfuUltra II Reaction Buffer | Industrial applications, Professional applications. |
| Industrial sector specific solutions | : PfuUltra II Fusion HS DNA Polymerase | Not applicable. |
| | : 10X PfuUltra II Reaction Buffer | Not applicable. |

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| PfuUltra II Fusion HS DNA Polymerase Glycerol | OSHA PEL 1989 (United States, 3/1989). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 10 mg/m ³ 8 hours. Form: Total dust OSHA PEL (United States, 2/2013). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust |
| 10X PfuUltra II Reaction Buffer Trometamol Ammonium sulphate Polyoxyethylene octyl phenyl ether | None. None. None. |

8.2 Exposure controls

| | |
|---|--|
| 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. |
|-------------------------|---|

Section 8. Exposure controls/personal protection

- 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

| | | |
|-------------------------|--|----------------|
| Physical state | : PfuUltra II Fusion HS DNA Polymerase | Liquid. |
| | : 10X PfuUltra II Reaction Buffer | Liquid. |
| Color | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | : 10X PfuUltra II Reaction Buffer | Not available. |
| Odor | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | : 10X PfuUltra II Reaction Buffer | Not available. |
| Odor 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. |

Section 9. Physical and chemical properties

| | | |
|---|---|--|
| 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. |
| Vapor pressure | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Vapor density | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Relative density | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Solubility | : PfuUltra II Fusion HS DNA Polymerase | Soluble in the following materials: cold water and hot water. |
| | 10X PfuUltra II Reaction Buffer | Easily soluble in the following materials: cold water and hot water. |
| Partition coefficient: n-octanol/water | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Auto-ignition temperature | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Decomposition temperature | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |
| Viscosity | : PfuUltra II Fusion HS DNA Polymerase | Not available. |
| | 10X PfuUltra II Reaction Buffer | Not available. |

Section 10. Stability and reactivity

| | | |
|--|---|--|
| 10.1 Reactivity | : PfuUltra II Fusion HS DNA Polymerase | No specific test data related to reactivity available for this product or its ingredients. |
| | 10X PfuUltra II Reaction Buffer | No specific test data related to reactivity available for this product or its ingredients. |
| 10.2 Chemical stability | : PfuUltra II Fusion HS DNA Polymerase | The product is stable. |
| | 10X PfuUltra II Reaction Buffer | The product is stable. |
| 10.3 Possibility of hazardous reactions | : PfuUltra II Fusion HS DNA Polymerase | Under normal conditions of storage and use, hazardous reactions will not occur. |
| | 10X PfuUltra II Reaction Buffer | Under normal conditions of storage and use, hazardous reactions will not occur. |
| 10.4 Conditions to avoid | : PfuUltra II Fusion HS DNA Polymerase | No specific data. |
| | 10X PfuUltra II Reaction Buffer | No specific data. |

Section 10. Stability and reactivity

10.5 Incompatible materials : PfuUltra II Fusion HS DNA Polymerase
10X PfuUltra II Reaction Buffer

May react or be incompatible with oxidizing materials.
May react or be incompatible with oxidizing materials.

10.6 Hazardous decomposition products : PfuUltra II Fusion HS DNA Polymerase
10X PfuUltra II Reaction 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.

Section 11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|--------------------------|------------|---------------------------|----------|
| PfuUltra II Fusion HS DNA Polymerase Glycerol | LD50 Oral | Rat | 12600 mg/kg | - |
| 10X PfuUltra II Reaction Buffer Trometamol | LD50 Dermal LD50 Oral | Rat Rat | >5000 mg/kg 5000 mg/kg | - - |
| Ammonium sulphate | LD50 Oral | Rat | 2840 mg/kg | - |

Irritation/Corrosion

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|--|------------------|--------|------------------------------|-------------|
| PfuUltra II Fusion HS DNA Polymerase Glycerol | Eyes - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| 10X PfuUltra II Reaction Buffer Trometamol | Skin - Moderate irritant Skin - Severe irritant | Rabbit Rabbit | - - | 25 Percent 500 milligrams | - - |
| Polyoxyethylene octyl phenyl ether | Eyes - Moderate irritant | Rabbit | - | 24 hours 10 microliters | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 microliters | - |

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Section 11. Toxicological information

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

| Name | Category | Route of exposure | Target organs |
|--|------------|-------------------|------------------------------|
| 10X PfuUltra II Reaction Buffer Trometamol | Category 3 | Not applicable. | Respiratory tract irritation |

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

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

Routes of entry anticipated: Oral, Dermal, Inhalation.

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact

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

Causes eye irritation.

Causes serious eye irritation.

Inhalation

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

No known significant effects or critical hazards.

No known significant effects or critical hazards.

Skin contact

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

No known significant effects or critical hazards.

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.

No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact

: PfuUltra II Fusion HS DNA Polymerase

Adverse symptoms may include the following:

irritation
watering
redness

10X PfuUltra II Reaction Buffer

Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation

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

No specific data.

No specific data.

Skin contact

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

No specific data.

No specific data.

Ingestion

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

No specific data.

No specific data.

Section 11. Toxicological information

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

Numerical measures of toxicity

Acute toxicity estimates

| Route | ATE value |
|---|---------------|
| 10X PfuUltra II Reaction Buffer Oral | 35309.3 mg/kg |

Section 12. Ecological information

12.1 Toxicity

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|--------------------------|
| PfuUltra II Fusion HS DNA Polymerase Glycerol | Acute LC50 54000 mg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| 10X PfuUltra II Reaction Buffer Trometamol | Acute EC50 >980 mg/l Fresh water Acute NOEC 520 mg/l Fresh water | Daphnia Daphnia | 48 hours 48 hours |
| Ammonium sulphate | Acute LC50 2.6 mg/l Fresh water Acute LC50 14000 to 15000 µg/l Fresh | Crustaceans - Ceriodaphnia dubia - Young Daphnia - Daphnia magna - | 48 hours 48 hours |

Section 12. Ecological information

| | | | |
|------------------------------------|---|--|----------|
| Polyoxyethylene octyl phenyl ether | water Acute LC50 68 µg/l Fresh water | Young Fish - Oncorhynchus gorboscha - Alevin | 96 hours |
| | Chronic NOEC 7.5 mg/l Marine water | Algae - Phaeodactylum tricornutum - Exponential growth phase | 96 hours |
| | Chronic NOEC 143 µg/l Marine water | Fish - Salmo salar - Post-smolt | 5 weeks |
| | 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

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|--|-------------------|------------|------------------|
| 10X PfuUltra II Reaction Buffer | | | |
| Ammonium sulphate | - | - | Readily |
| Polyoxyethylene octyl phenyl ether | - | - | Readily |

12.3 Bioaccumulative potential

| Product/ingredient name | LogP _{ow} | BCF | Potential |
|---|--------------------|-----|-----------|
| PfuUltra II Fusion HS DNA Polymerase | | | |
| Glycerol | -1.76 | - | low |
| 10X PfuUltra II Reaction Buffer | | | |
| Trometamol | -1.56 | - | low |
| Ammonium sulphate | -5.1 | - | low |
| Polyoxyethylene octyl phenyl ether | 4.86 | - | high |

12.4 Mobility in soil

Soil/water partition coefficient (K_{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

Section 13. Disposal considerations

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

Regulatory information

DOT / IMDG / IATA : Not regulated.

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-; Polyoxyethylene octyl phenyl ether
United States inventory (TSCA 8b): All components are listed or exempted.
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

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 : Immediate (acute) health hazard

Composition/information on ingredients

Section 15. Regulatory information

| Name | % | Fire hazard | Sudden release of pressure | Reactive | Immediate (acute) health hazard | Delayed (chronic) health hazard |
|---|-----------|-------------|----------------------------|----------|---------------------------------|---------------------------------|
| PfuUltra II Fusion HS DNA Polymerase Glycerol | ≥50 - ≤75 | No. | No. | No. | Yes. | No. |
| 10X PfuUltra II Reaction Buffer Trometamol | ≤3 | Yes. | No. | No. | Yes. | No. |
| Ammonium sulphate | ≤3 | No. | No. | No. | Yes. | No. |
| Polyoxyethylene octyl phenyl ether | ≤2.9 | No. | No. | No. | Yes. | No. |

SARA 313

| | Product name | CAS number | % |
|--|---|------------|----|
| Form R - Reporting requirements | 10X PfuUltra II Reaction Buffer Ammonium sulphate | 7783-20-2 | ≤3 |
| Supplier notification | 10X PfuUltra II Reaction Buffer Ammonium sulphate | 7783-20-2 | ≤3 |

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

No products were found.

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 inventory** : Not determined.
- China** : Not determined.
- Europe** : All components are listed or exempted.
- Japan** : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

Section 15. Regulatory information

| | |
|--------------------------|--|
| 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. |

Section 16. Other information

History

| | |
|-------------------------------|---------------|
| Date of issue | : 04/28/2017 |
| Date of previous issue | : 08/30/2016. |
| Version | : 5 |

✔ Indicates information that has changed from previously issued version.

Notice to reader

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