Section 1. Identification

Product identifier : ArcticExpress Competent Cells, Product Name 230191
Part No. (Chemical Kit) : 230191
Part No. : ArcticExpress competent cells 230191-41
           pUC 18 DNA Control Plasmid 200231-42
           XL10-Gold 2-Mercaptoethanol 200314-43

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

Analytical reagent.
ArcticExpress competent cells 1 ml (10x0.1 ml)
pUC 18 DNA Control Plasmid 0.01 mL
XL10-Gold 2-Mercaptoethanol 0.05 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

XL10-Gold
2-Mercaptoethanol
H318  SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1
H317  SKIN SENSITISATION - Category 1
H412  LONG-TERM AQUATIC HAZARD - Category 3

GHS label elements

Hazard pictograms :

Signal word : ArcticExpress competent cells No signal word.
pUC 18 DNA Control Plasmid No signal word.
XL10-Gold DANGER
2-Mercaptoethanol

Hazard statements : ArcticExpress competent cells No known significant effects or critical hazards.
pUC 18 DNA Control Plasmid No known significant effects or critical hazards.
XL10-Gold H318 - Causes serious eye damage.
2-Mercaptoethanol

H317 - May cause an allergic skin reaction.
H412 - Harmful to aquatic life with long lasting effects.
Section 2. Hazard(s) identification

Prevention

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- Not applicable.

Response

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- P280 - Wear protective gloves. Wear eye or face protection.
- P273 - Avoid release to the environment.
- P261 - Avoid breathing vapour.
- P272 - Contaminated work clothing should not be allowed out of the workplace.

Protection

- Not applicable.

Storage

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- Not applicable.

Disposal

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- Not applicable.

Other hazards which do not result in classification

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- None known.

Section 3. Composition and ingredient information

Substance/mixture

- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

- Mixture

CAS number/other identifiers
Section 3. Composition and ingredient information

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>% (w/w)</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>≥10 - ≤30</td>
<td>56-81-5</td>
</tr>
<tr>
<td>Sucrose</td>
<td>≤10</td>
<td>57-50-1</td>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Mercaptoethanol</td>
<td>≤5</td>
<td>60-24-2</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.

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

Section 4. First aid measures

**Description of necessary first aid measures**

**Eye contact**

- ArcticExpress competent cells: 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.
- pUC 18 DNA Control Plasmid: 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.
- XL10-Gold 2-Mercaptoethanol: Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician.

**Inhalation**

- ArcticExpress competent cells: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
- pUC 18 DNA Control Plasmid: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
- XL10-Gold 2-Mercaptoethanol: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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. 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.

**Skin contact**

- ArcticExpress competent cells: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- pUC 18 DNA Control Plasmid: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- XL10-Gold 2-Mercaptoethanol: Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water.
### Section 4. First aid measures

**Ingestion**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td>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.</td>
</tr>
<tr>
<td>pUC 18 DNA Control Plasmid</td>
<td>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.</td>
</tr>
<tr>
<td>XL10-Gold</td>
<td>Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician. 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.</td>
</tr>
</tbody>
</table>

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

#### Potential acute health effects

<table>
<thead>
<tr>
<th>Eye contact</th>
<th>ArcticExpress competent cells</th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pUC 18 DNA Control Plasmid</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>XL10-Gold</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td></td>
<td>2-Mercaptoethanol</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inhalation</th>
<th>ArcticExpress competent cells</th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pUC 18 DNA Control Plasmid</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>XL10-Gold</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>2-Mercaptoethanol</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skin contact</th>
<th>ArcticExpress competent cells</th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pUC 18 DNA Control Plasmid</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>XL10-Gold</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td></td>
<td>2-Mercaptoethanol</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingestion</th>
<th>ArcticExpress competent cells</th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pUC 18 DNA Control Plasmid</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>XL10-Gold</td>
<td>No known significant effects or critical hazards.</td>
</tr>
<tr>
<td></td>
<td>2-Mercaptoethanol</td>
<td></td>
</tr>
</tbody>
</table>

#### Over-exposure signs/symptoms

**Date of issue/Date of revision**: 18/10/2016  
**Date of previous issue**: 24/08/2015  
**Version**: 5  
**Page**: 4/18
## Section 4. First aid measures

<table>
<thead>
<tr>
<th>Condition</th>
<th>ArcticExpress competent cells</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
</tr>
</thead>
</table>
| **Eye contact** | ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | Adverse symptoms may include the following:  
  - pain  
  - watering  
  - redness |
| **Inhalation**  | ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | No specific data. |
| **Skin contact**| ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | Adverse symptoms may include the following:  
  - pain or irritation  
  - redness  
  - blistering may occur |
| **Ingestion**   | ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | No specific data. |

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

| Notes to physician | ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | Adverse symptoms may include the following:  
  - stomach pains |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific treatments</td>
<td>ArcticExpress competent cells</td>
<td>pUC 18 DNA Control Plasmid</td>
<td>XL10-Gold</td>
<td>2-Mercaptoethanol</td>
<td>No specific treatment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Protection of first-aiders | ArcticExpress competent cells | pUC 18 DNA Control Plasmid  | XL10-Gold | 2-Mercaptoethanol | No action shall be taken involving any personal risk or without suitable training.  
  - If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. |

See toxicological information (Section 11)
Section 5. Firefighting measures

**Extinguishing media**

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>Use an extinguishing agent suitable for the surrounding fire.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td>Use an extinguishing agent suitable for the surrounding fire.</td>
</tr>
<tr>
<td>pUC 18 DNA Control Plasmid</td>
<td>Use an extinguishing agent suitable for the surrounding fire.</td>
</tr>
<tr>
<td>XL10-Gold</td>
<td>Use an extinguishing agent suitable for the surrounding fire.</td>
</tr>
<tr>
<td>2-Mercaptoethanol</td>
<td>None known.</td>
</tr>
</tbody>
</table>

**Unsuitable extinguishing media**

| ArcticExpress competent cells| None known. |
| pUC 18 DNA Control Plasmid   | None known. |
| XL10-Gold                    | None known. |
| 2-Mercaptoethanol            | None known. |

**Specific hazards arising from the chemical**

| ArcticExpress competent cells| In a fire or if heated, a pressure increase will occur and the container may burst. |
| pUC 18 DNA Control Plasmid   | In a fire or if heated, a pressure increase will occur and the container may burst. |
| XL10-Gold                    | In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. |
| 2-Mercaptoethanol            | None known. |

**Hazardous thermal decomposition products**

| ArcticExpress competent cells| Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides halogenated compounds metal oxide/oxides |
| pUC 18 DNA Control Plasmid   | Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides halogenated compounds metal oxide/oxides |
| XL10-Gold                    | Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides halogenated compounds metal oxide/oxides |
| 2-Mercaptoethanol            | No specific data. |

**Special protective actions for fire-fighters**

| ArcticExpress competent cells| 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. |
| pUC 18 DNA Control Plasmid   | 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. |
| XL10-Gold                    | 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. |
| 2-Mercaptoethanol            | None known. |

**Special protective equipment for fire-fighters**

| ArcticExpress competent cells| Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
| pUC 18 DNA Control Plasmid   | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
| XL10-Gold                    | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus |
| 2-Mercaptoethanol            | None known. |
### Section 5. Firefighting measures

(SCBA) with a full face-piece operated in positive pressure mode.

### Section 6. Accidental release measures

<table>
<thead>
<tr>
<th></th>
<th>Personal precautions, protective equipment and emergency procedures</th>
</tr>
</thead>
</table>
| **For non-emergency personnel** | ArcticExpress competent cells  
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.  
pUC 18 DNA Control Plasmid  
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.  
XL10-Gold  
2-Mercaptoethanol  
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. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. |
| **For emergency responders** | ArcticExpress competent cells  
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".  
pUC 18 DNA Control Plasmid  
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".  
XL10-Gold  
2-Mercaptoethanol  
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** | ArcticExpress competent cells  
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).  
pUC 18 DNA Control Plasmid  
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).  
XL10-Gold  
2-Mercaptoethanol  
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). Water polluting material. May be harmful to the environment if released in large quantities. |

**Methods and material for containment and cleaning up**
Section 6. Accidental release measures

Methods for cleaning up:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</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>
</tr>
<tr>
<td>pUC 18 DNA Control Plasmid</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>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</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>
</tr>
</tbody>
</table>

Section 7. Handling and storage

Precautions for safe handling:

Protective measures:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td>Put on appropriate personal protective equipment (see Section 8).</td>
</tr>
<tr>
<td>pUC 18 DNA Control Plasmid</td>
<td>Put on appropriate personal protective equipment (see Section 8).</td>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</td>
<td>Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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>
</tr>
</tbody>
</table>

Advice on general occupational hygiene:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td>Potentially biohazardous material. 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>
</tr>
<tr>
<td>pUC 18 DNA Control Plasmid</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>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</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>
</tr>
</tbody>
</table>
Section 7. Handling and storage

### Conditions for safe storage, including any incompatibilities

- **ArcticExpress competent cells**
  - 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.

- **pUC 18 DNA Control Plasmid**
  - 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.

- **XL10-Gold 2-Mercaptoethanol**
  - 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. Store locked up. 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

### Control parameters

#### Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ArcticExpress competent cells</em></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td><em>Safe Work Australia (Australia, 1/2014).</em></td>
</tr>
<tr>
<td></td>
<td>TWA: 10 mg/m³ 8 hours.</td>
</tr>
<tr>
<td>Sucrose</td>
<td><em>Safe Work Australia (Australia, 1/2014).</em></td>
</tr>
<tr>
<td></td>
<td>TWA: 10 mg/m³ 8 hours.</td>
</tr>
</tbody>
</table>

### Appropriate engineering controls

- If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

### 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**: Handle as biohazard material (Biosafety level 1). 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. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Section 8. Exposure controls and 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 and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

**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

**Appearance**

**Physical state**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

**Colour**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

**Odour**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

**Odour threshold**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

**pH**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

**Melting point**
- ArcticExpress competent cells
- pUC 18 DNA Control Plasmid
- XL10-Gold
- 2-Mercaptoethanol

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# Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>ArcticExpress competent cells</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling point</td>
<td>Not available.</td>
<td>100°C (212°F)</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>ArcticExpress competent cells</td>
<td>pUC 18 DNA Control Plasmid</td>
<td>Not applicable.</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
<td>pUC 18 DNA Control Plasmid</td>
<td>Not applicable.</td>
<td></td>
</tr>
<tr>
<td>Lower and upper explosive (flammable) limits</td>
<td>Not available.</td>
<td>XL10-Gold</td>
<td>Not applicable.</td>
<td></td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not available.</td>
<td>2-Mercaptoethanol</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Vapour density</td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Solubility</td>
<td>Easily soluble in the following materials: cold water and hot water.</td>
<td>Easily soluble in the following materials: cold water and hot water.</td>
<td>Easily soluble in the following materials: cold water and hot water.</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Not available.</td>
<td>pUC 18 DNA Control Plasmid</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available.</td>
<td>XL10-Gold</td>
<td>Not available.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-Mercaptoethanol</td>
<td>Not available.</td>
<td>Not available.</td>
<td></td>
</tr>
</tbody>
</table>
## Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>ArcticExpress competent cells</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

## Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>ArcticExpress competent cells</th>
<th>pUC 18 DNA Control Plasmid</th>
<th>XL10-Gold</th>
<th>2-Mercaptoethanol</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>
<td>No specific test data related to reactivity available for this product or its ingredients.</td>
<td></td>
</tr>
<tr>
<td><strong>Chemical stability</strong></td>
<td>The product is stable.</td>
<td>The product is stable.</td>
<td>The product is stable.</td>
<td></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>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
<td></td>
</tr>
<tr>
<td><strong>Conditions to avoid</strong></td>
<td>No specific data.</td>
<td>No specific data.</td>
<td>No specific data.</td>
<td></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>
<td>May react or be incompatible with oxidising materials.</td>
<td></td>
</tr>
<tr>
<td><strong>Hazardous decomposition products</strong></td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
<td></td>
</tr>
</tbody>
</table>
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>ArcticExpress competent cells</td>
<td>Glycerol</td>
<td>Rat</td>
<td>12600 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td></td>
<td>29700 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sucrose</td>
<td>Rat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>200 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>244 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>ArcticExpress competent cells</td>
<td>Glycerol</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>XL10-Gold 2-Mercaptoethanol</td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>2 milligrams</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)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</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 likely routes of exposure:
ArcticExpress competent cells Routes of entry anticipated: Oral, Dermal, Inhalation.
pUC 18 DNA Control Plasmid Not available.
XL10-Gold 2-Mercaptoethanol Routes of entry anticipated: Oral, Dermal, Inhalation.

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Section 11. Toxicological information

### Potential acute health effects

#### Eye contact
- **ArcticExpress competent cells**
  - No known significant effects or critical hazards.
- **pUC 18 DNA Control Plasmid**
  - No known significant effects or critical hazards.
- **XL10-Gold**
  - Causes serious eye damage.
- **2-Mercaptoethanol**

#### Inhalation
- **ArcticExpress competent cells**
  - No known significant effects or critical hazards.
- **pUC 18 DNA Control Plasmid**
  - No known significant effects or critical hazards.
- **XL10-Gold**
  - No known significant effects or critical hazards.
- **2-Mercaptoethanol**

#### Skin contact
- **ArcticExpress competent cells**
  - No known significant effects or critical hazards.
- **pUC 18 DNA Control Plasmid**
  - No known significant effects or critical hazards.
- **XL10-Gold**
  - May cause an allergic skin reaction.
- **2-Mercaptoethanol**

#### Ingestion
- **ArcticExpress competent cells**
  - No known significant effects or critical hazards.
- **pUC 18 DNA Control Plasmid**
  - No known significant effects or critical hazards.
- **XL10-Gold**
  - No known significant effects or critical hazards.
- **2-Mercaptoethanol**

### Symptoms related to the physical, chemical and toxicological characteristics

#### Eye contact
- **ArcticExpress competent cells**
  - No specific data.
- **pUC 18 DNA Control Plasmid**
  - No specific data.
- **XL10-Gold**
  - No specific data.
- **2-Mercaptoethanol**
  - Adverse symptoms may include the following:
    - pain
    - watering
    - redness

#### Inhalation
- **ArcticExpress competent cells**
  - No specific data.
- **pUC 18 DNA Control Plasmid**
  - No specific data.
- **XL10-Gold**
  - No specific data.
- **2-Mercaptoethanol**

#### Skin contact
- **ArcticExpress competent cells**
  - No specific data.
- **pUC 18 DNA Control Plasmid**
  - No specific data.
- **XL10-Gold**
  - Adverse symptoms may include the following:
    - pain or irritation
    - redness
    - blistering may occur
- **2-Mercaptoethanol**

#### Ingestion
- **ArcticExpress competent cells**
  - No specific data.
- **pUC 18 DNA Control Plasmid**
  - No specific data.
- **XL10-Gold**
  - Adverse symptoms may include the following:
    - stomach pains
- **2-Mercaptoethanol**

### 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.

---

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Potential delayed effects: Not available.

Potential chronic health effects: Not available.

General: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
No known significant effects or critical hazards.

Carcinogenicity: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
No known significant effects or critical hazards.

Mutagenicity: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
No known significant effects or critical hazards.

Teratogenicity: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
No known significant effects or critical hazards.

Developmental effects: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
No known significant effects or critical hazards.

Fertility effects: ArcticExpress competent cells
pUC 18 DNA Control Plasmid
XL10-Gold
2-Mercaptoethanol
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>Oral</td>
<td>5545.5 mg/kg</td>
</tr>
<tr>
<td>Dermal</td>
<td>4545.5 mg/kg</td>
</tr>
<tr>
<td>Inhalation (vapours)</td>
<td>45.45 mg/l</td>
</tr>
</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>ArcticExpress competent cells Glycerol</td>
<td>Acute LC50 54000 mg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

Persistence and degradability

Not available.

Bioaccumulative potential

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Section 12. Ecological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcticExpress competent cells</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>-1.76</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Sucrose</td>
<td>-3.7</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>XL10-Gold 2-Mercaptoethanol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Mercaptoethanol</td>
<td>-0.056</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

Soil/water partition coefficient (K<sub>OC</sub>): 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 spill 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**

No listed substance

**Model Work Health and Safety Regulations - Scheduled Substances**

No listed substance

**Australia inventory (AICS)**

All components are listed or exempted.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

**Montreal Protocol (Annexes A, B, C, E)**

Not listed.
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 : 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 : Not determined.
Philippines : Not determined.
Republic of Korea : All components are listed or exempted.
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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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>XL10-Gold 2-Mercaptoethanol</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Eye Dam. 1, H318</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Skin Sens. 1, H317</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Chronic 3, H412</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader
Section 16. Any other relevant information

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