Conforms to US OSHA Hazard Communication 29CFR1910.1200

# SAFETY DATA SHEET

Agilent Technologies

XL1-Red Competent Cells, Part Number 200129

## Section 1. Identification

### 1.1 Product identifier

**Product name** : XL1-Red Competent Cells, Part Number 200129

**Part no. (chemical kit)** : 200129

**Part no.** :

| | |
|---|---|
| XL1-Red Competent Cells | 200129-41 |
| pUC 18 DNA Control Plasmid | 200231-42 |
| Beta Mercaptoethanol | 210200-43 |
| XL1-Blue Supercompetent Cells | 200236-41 |

**Validation date** : 1/5/2024

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

**Identified uses** : Analytical reagent.

| | |
|---|---|
| XL1-Red Competent Cells | 1 ml (5 x 0.2 ml) |
| pUC 18 DNA Control Plasmid | 0.01 ml (0.1 ng/µl) |
| Beta Mercaptoethanol | 0.025 ml (25 µl 1.42M) |
| XL1-Blue Supercompetent Cells | 1 ml (5 x 0.2 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** :

| | |
|---|---|
| XL1-Red Competent Cells | This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). |
| pUC 18 DNA Control Plasmid | While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product. |
| Beta Mercaptoethanol | This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). |
| XL1-Blue Supercompetent Cells | This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). |

### Classification of the substance or mixture

**XL1-Red Competent Cells**

| | |
|---|---|
| H320 | EYE IRRITATION - Category 2B |

**Beta Mercaptoethanol**

| | |
|---|---|
| H312 | ACUTE TOXICITY (dermal) - Category 4 |
| H315 | SKIN IRRITATION - Category 2 |
| H318 | SERIOUS EYE DAMAGE - Category 1 |
| H317 | SKIN SENSITIZATION - Category 1 |
| H361 | TOXIC TO REPRODUCTION - Category 2 |
| H373 | SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 |

# Section 2. Hazards identification

H412 AQUATIC HAZARD (LONG-TERM) - Category 3

**XL1-Blue Supercompetent Cells**

H320 EYE IRRITATION - Category 2B

| | |
|---|---|
| XL1-Red Competent Cells | Percentage of the mixture consisting of ingredient (s) of unknown hazards to the aquatic environment: 5% |
| XL1-Blue Supercompetent Cells | Percentage of the mixture consisting of ingredient (s) of unknown hazards to the aquatic environment: 5% |

## 2.2 GHS label elements

**Hazard pictograms** : Beta Mercaptoethanol

**Signal word**

| | |
|---|---|
| XL1-Red Competent Cells | Warning |
| pUC 18 DNA Control Plasmid | No signal word. |
| Beta Mercaptoethanol | Danger |
| XL1-Blue Supercompetent Cells | Warning |

**Hazard statements**

| | |
|---|---|
| XL1-Red Competent Cells | H320 - Causes eye irritation. |
| pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| Beta Mercaptoethanol | H312 - Harmful in contact with skin.<br>H315 - Causes skin irritation.<br>H317 - May cause an allergic skin reaction.<br>H318 - Causes serious eye damage.<br>H361 - Suspected of damaging fertility or the unborn child.<br>H373 - May cause damage to organs through prolonged or repeated exposure.<br>H412 - Harmful to aquatic life with long lasting effects. |
| XL1-Blue Supercompetent Cells | H320 - Causes eye irritation. |

**Precautionary statements**

**Prevention**

| | |
|---|---|
| XL1-Red Competent Cells | Not applicable. |
| pUC 18 DNA Control Plasmid | Not applicable. |
| Beta Mercaptoethanol | P201 - Obtain special instructions before use.<br>P280 - Wear protective gloves, protective clothing and eye or face protection.<br>P273 - Avoid release to the environment.<br>P260 - Do not breathe vapor.<br>P264 - Wash thoroughly after handling. |
| XL1-Blue Supercompetent Cells | Not applicable. |

**Response**

| | |
|---|---|
| XL1-Red Competent Cells | P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>P337 + P313 - If eye irritation persists: Get medical advice or attention. |
| pUC 18 DNA Control Plasmid | Not applicable. |
| Beta Mercaptoethanol | P308 + P313 - IF exposed or concerned: Get medical advice or attention.<br>P362 + P364 - Take off contaminated clothing and wash it before reuse.<br>P363 - Wash contaminated clothing before reuse.<br>P302 + P312, P352 - IF ON SKIN: Call a POISON CENTER or doctor if you feel unwell. Wash with |

# Section 2. Hazards identification

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| | | | plenty of water.<br>P333 + P313 - If skin irritation or rash occurs: Get medical advice or attention.<br>P305 + P351 + P338, P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor. |
| | | XL1-Blue Supercompetent Cells | P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>P337 + P313 - If eye irritation persists: Get medical advice or attention. |
| **Storage** | : | XL1-Red Competent Cells | Not applicable. |
| | | pUC 18 DNA Control Plasmid | Not applicable. |
| | | Beta Mercaptoethanol | Not applicable. |
| | | XL1-Blue Supercompetent Cells | Not applicable. |
| **Disposal** | : | XL1-Red Competent Cells | Not applicable. |
| | | pUC 18 DNA Control Plasmid | Not applicable. |
| | | Beta Mercaptoethanol | P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations. |
| | | XL1-Blue Supercompetent Cells | Not applicable. |
| **Supplemental label elements** | : | XL1-Red Competent Cells | None known. |
| | | pUC 18 DNA Control Plasmid | None known. |
| | | Beta Mercaptoethanol | None known. |
| | | XL1-Blue Supercompetent Cells | None known. |

**2.3 Other hazards**

| | | | |
|---|---|---|---|
| **Hazards not otherwise classified** | : | XL1-Red Competent Cells | None known. |
| | | pUC 18 DNA Control Plasmid | None known. |
| | | Beta Mercaptoethanol | None known. |
| | | XL1-Blue Supercompetent Cells | None known. |

# Section 3. Composition/information on ingredients

| | | | |
|---|---|---|---|
| **Substance/mixture** | : | XL1-Red Competent Cells | Mixture |
| | | pUC 18 DNA Control Plasmid | Mixture |
| | | Beta Mercaptoethanol | Mixture |
| | | XL1-Blue Supercompetent Cells | Mixture |

| Ingredient name | % | CAS number |
|---|---|---|
| **XL1-Red Competent Cells** | | |
| Glycerol | ≥10 - ≤25 | 56-81-5 |
| Dimethyl sulfoxide | ≤10 | 67-68-5 |
| Potassium chloride | ≤3 | 7447-40-7 |
| **Beta Mercaptoethanol** | | |
| 2-Mercaptoethanol | ≤12 | 60-24-2 |
| **XL1-Blue Supercompetent Cells** | | |
| Glycerol | ≥10 - ≤25 | 56-81-5 |

# Section 3. Composition/information on ingredients

| | | |
|---|---|---|
| Dimethyl sulfoxide | ≤10 | 67-68-5 |
| Potassium chloride | ≤3 | 7447-40-7 |

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 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** :

XL1-Red Competent Cells: 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.

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.

Beta 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.

XL1-Blue Supercompetent Cells: 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.

**Inhalation** :

XL1-Red Competent Cells: 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.

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.

Beta 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

# Section 4. First aid measures

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| | | | 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. |
| | | XL1-Blue Supercompetent Cells | 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. |
| **Skin contact** | : | XL1-Red Competent Cells | 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. |
| | | pUC 18 DNA Control Plasmid | Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. |
| | | Beta 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 before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| | | XL1-Blue Supercompetent Cells | 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** | : | XL1-Red Competent Cells | Wash out mouth with water. Remove dentures if any. 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. |
| | | pUC 18 DNA Control Plasmid | Wash out mouth with water. 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. |

# Section 4. First aid measures

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| | Beta Mercaptoethanol | Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. 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. |
| | XL1-Blue Supercompetent Cells | Wash out mouth with water. Remove dentures if any. 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** | : | XL1-Red Competent Cells | Causes eye irritation. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | Causes serious eye damage. |
| | | XL1-Blue Supercompetent Cells | Causes eye irritation. |
| **Inhalation** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | No known significant effects or critical hazards. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |
| **Skin contact** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | Harmful in contact with skin. Causes skin irritation. May cause an allergic skin reaction. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |
| **Ingestion** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | No known significant effects or critical hazards. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |

### Over-exposure signs/symptoms

| | | | |
|---|---|---|---|
| **Eye contact** | : | XL1-Red Competent Cells | Adverse symptoms may include the following:<br>irritation<br>watering<br>redness |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>pain<br>watering |

# Section 4. First aid measures

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| | | | redness |
| | | XL1-Blue Supercompetent Cells | Adverse symptoms may include the following:<br>irritation<br>watering<br>redness |
| **Inhalation** | : | XL1-Red Competent Cells | No specific data. |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| | | XL1-Blue Supercompetent Cells | No specific data. |
| **Skin contact** | : | XL1-Red Competent Cells | No specific data. |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>pain or irritation<br>redness<br>blistering may occur<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| | | XL1-Blue Supercompetent Cells | No specific data. |
| **Ingestion** | : | XL1-Red Competent Cells | No specific data. |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>stomach pains<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| | | XL1-Blue Supercompetent Cells | No specific data. |

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

| | | | |
|---|---|---|---|
| **Notes to physician** | : | XL1-Red Competent Cells | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| | | pUC 18 DNA Control Plasmid | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| | | Beta Mercaptoethanol | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| | | XL1-Blue Supercompetent Cells | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| **Specific treatments** | : | XL1-Red Competent Cells | No specific treatment. |
| | | pUC 18 DNA Control Plasmid | No specific treatment. |
| | | Beta Mercaptoethanol | No specific treatment. |
| | | XL1-Blue Supercompetent Cells | No specific treatment. |
| **Protection of first-aiders** | : | XL1-Red Competent Cells | 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. |
| | | pUC 18 DNA Control Plasmid | No action shall be taken involving any personal risk or without suitable training. |
| | | Beta 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 |

# Section 4. First aid measures

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| | | 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. |
| | XL1-Blue Supercompetent Cells | 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** | : | XL1-Red Competent Cells | Use an extinguishing agent suitable for the surrounding fire. |
| | | pUC 18 DNA Control Plasmid | Use an extinguishing agent suitable for the surrounding fire. |
| | | Beta Mercaptoethanol | Use an extinguishing agent suitable for the surrounding fire. |
| | | XL1-Blue Supercompetent Cells | Use an extinguishing agent suitable for the surrounding fire. |
| **Unsuitable extinguishing media** | : | XL1-Red Competent Cells | None known. |
| | | pUC 18 DNA Control Plasmid | None known. |
| | | Beta Mercaptoethanol | None known. |
| | | XL1-Blue Supercompetent Cells | None known. |

## 5.2 Special hazards arising from the substance or mixture

| | | | |
|---|---|---|---|
| **Specific hazards arising from the chemical** | : | XL1-Red 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. |
| | | Beta Mercaptoethanol | 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. |
| | | XL1-Blue Supercompetent Cells | In a fire or if heated, a pressure increase will occur and the container may burst. |
| **Hazardous thermal decomposition products** | : | XL1-Red Competent Cells | Decomposition products may include the following materials:<br>carbon dioxide<br>carbon monoxide<br>sulfur oxides<br>halogenated compounds<br>metal oxide/oxides |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Decomposition products may include the following materials:<br>carbon dioxide<br>carbon monoxide<br>sulfur oxides |
| | | XL1-Blue Supercompetent Cells | Decomposition products may include the following materials:<br>carbon dioxide<br>carbon monoxide<br>sulfur oxides |

# Section 5. Fire-fighting measures

halogenated compounds
metal oxide/oxides

## 5.3 Advice for firefighters

| | | | |
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| **Special protective actions for fire-fighters** | : | XL1-Red 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. |
| | | Beta Mercaptoethanol | 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. |
| | | XL1-Blue Supercompetent 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. |
| **Special protective equipment for fire-fighters** | : | XL1-Red 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. |
| | | Beta Mercaptoethanol | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
| | | XL1-Blue Supercompetent Cells | 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** | : | XL1-Red 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 spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. 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 spilled material. Put on appropriate personal protective equipment. |
| | | Beta 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 |

# Section 6. Accidental release measures

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|---|---|---|
| | | touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. |
| | XL1-Blue Supercompetent 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 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** : | XL1-Red Competent Cells | 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". |
| | pUC 18 DNA Control Plasmid | 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". |
| | Beta Mercaptoethanol | 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". |
| | XL1-Blue Supercompetent Cells | 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** : | XL1-Red Competent Cells | 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). |
| | pUC 18 DNA Control Plasmid | 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). |
| | Beta Mercaptoethanol | 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). Water polluting material. May be harmful to the environment if released in large quantities. |
| | XL1-Blue Supercompetent Cells | 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). |

**6.3 Methods and materials for containment and cleaning up**

# Section 6. Accidental release measures

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| **Methods for cleaning up** | : | XL1-Red Competent Cells | 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. |
| | | pUC 18 DNA Control Plasmid | 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. |
| | | Beta Mercaptoethanol | 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. |
| | | XL1-Blue Supercompetent Cells | 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** | : | XL1-Red Competent Cells | 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. |
| | | pUC 18 DNA Control Plasmid | Put on appropriate personal protective equipment (see Section 8). |
| | | Beta Mercaptoethanol | 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. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor 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. |
| | | XL1-Blue Supercompetent Cells | 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 |

# Section 7. Handling and storage

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| | | tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. |
| **Advice on general occupational hygiene** | : XL1-Red Competent Cells | 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. |
| | pUC 18 DNA Control Plasmid | 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. |
| | Beta Mercaptoethanol | 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. |
| | XL1-Blue Supercompetent Cells | 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. |
| **7.2 Conditions for safe storage, including any incompatibilities** | : XL1-Red 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use. |
| | 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use. |
| | Beta 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 |

# Section 7. Handling and storage

| | |
|---|---|
| | 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 unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use. |
| XL1-Blue Supercompetent 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 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** | : | XL1-Red Competent Cells | Industrial applications, Professional applications. |
| | | pUC 18 DNA Control Plasmid | Industrial applications, Professional applications. |
| | | Beta Mercaptoethanol | Industrial applications, Professional applications. |
| | | XL1-Blue Supercompetent Cells | Industrial applications, Professional applications. |
| **Industrial sector specific solutions** | : | XL1-Red Competent Cells | Not available. |
| | | pUC 18 DNA Control Plasmid | Not available. |
| | | Beta Mercaptoethanol | Not available. |
| | | XL1-Blue Supercompetent Cells | Not available. |

# Section 8. Exposure controls/personal protection

## 8.1 Control parameters

### Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| **XL1-Red Competent Cells** | |
| Glycerol | **OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 10 mg/m³ 8 hours. Form: Total dust<br>**OSHA PEL (United States, 5/2018).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 15 mg/m³ 8 hours. Form: Total dust<br>**CAL OSHA PEL (United States, 5/2018).**<br>TWA: 5 mg/m³ 8 hours. Form: respirable fraction<br>TWA: 10 mg/m³ 8 hours. Form: total dust |
| Dimethyl sulfoxide | **OARS WEEL (United States, 4/2022).**<br>TWA: 250 ppm 8 hours. |
| Potassium chloride | None. |
| **Beta Mercaptoethanol** | |
| 2-Mercaptoethanol | **OARS WEEL (United States, 4/2022).**<br>**Absorbed through skin.**<br>TWA: 0.2 ppm 8 hours. |

# Section 8. Exposure controls/personal protection

| | |
|---|---|
| **XL1-Blue Supercompetent Cells** | |
| Glycerol | **OSHA PEL 1989 (United States, 3/1989).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 10 mg/m³ 8 hours. Form: Total dust<br>**OSHA PEL (United States, 5/2018).**<br>TWA: 5 mg/m³ 8 hours. Form: Respirable fraction<br>TWA: 15 mg/m³ 8 hours. Form: Total dust<br>**CAL OSHA PEL (United States, 5/2018).**<br>TWA: 5 mg/m³ 8 hours. Form: respirable fraction<br>TWA: 10 mg/m³ 8 hours. Form: total dust |
| Dimethyl sulfoxide | **OARS WEEL (United States, 4/2022).**<br>TWA: 250 ppm 8 hours. |
| Potassium chloride | None. |

**Biological exposure indices**

No exposure indices known.

**8.2 Exposure controls**

**Appropriate engineering controls** : If user operations generate dust, fumes, gas, vapor 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.

**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.

# Section 8. Exposure controls/personal protection

**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 and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

**Appearance**

**Physical state** :

| | |
|---|---|
| XL1-Red Competent Cells | Liquid. |
| pUC 18 DNA Control Plasmid | Liquid. |
| Beta Mercaptoethanol | Liquid. |
| XL1-Blue Supercompetent Cells | Liquid. |

**Color** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Odor** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Odor threshold** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**pH** :

| | |
|---|---|
| XL1-Red Competent Cells | 6.4 |
| pUC 18 DNA Control Plasmid | 7.5 |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | 6.4 |

**Melting point/freezing point** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | 0°C (32°F) |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Boiling point, initial boiling point, and boiling range** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | 100°C (212°F) |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Flash point** :

| Ingredient name | Closed cup °C | Closed cup °F | Closed cup Method | Open cup °C | Open cup °F | Open cup Method |
|---|---|---|---|---|---|---|
| **XL1-Red Competent Cells** | | | | | | |
| Dimethyl sulfoxide | 87 | 188.6 | ASTM D 93 | 87 | 188.6 | - |
| Glycerol | - | - | - | 177 | 350.6 | - |
| **Beta Mercaptoethanol** | | | | | | |
| 2-Mercaptoethanol | 74 | 165.2 | - | 74 | 165.2 | - |
| **XL1-Blue Supercompetent Cells** | | | | | | |

# Section 9. Physical and chemical properties and safety characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Dimethyl sulfoxide | 87 | 188.6 | ASTM D 93 | 87 | 188.6 | - |
| Glycerol | - | - | - | 177 | 350.6 | - |

**Evaporation rate** :
XL1-Red Competent Cells — Not available.
pUC 18 DNA Control Plasmid — Not available.
Beta Mercaptoethanol — Not available.
XL1-Blue Supercompetent Cells — Not available.

**Flammability** :
XL1-Red Competent Cells — Not applicable.
pUC 18 DNA Control Plasmid — Not applicable.
Beta Mercaptoethanol — Not applicable.
XL1-Blue Supercompetent Cells — Not applicable.

**Lower and upper explosion limit/flammability limit** :
XL1-Red Competent Cells — Not available.
pUC 18 DNA Control Plasmid — Not available.
Beta Mercaptoethanol — Not available.
XL1-Blue Supercompetent Cells — Not available.

**Vapor pressure** :

| Ingredient name | Vapor Pressure at 20°C | | | Vapor pressure at 50°C | | |
|---|---|---|---|---|---|---|
| | mm Hg | kPa | Method | mm Hg | kPa | Method |
| **XL1-Red Competent Cells** | | | | | | |
| water | 17.5 | 2.3 | - | 92.258 | 12.3 | - |
| Dimethyl sulfoxide | 0.42 | 0.056 | EU A.4 | - | - | - |
| **pUC 18 DNA Control Plasmid** | | | | | | |
| water | 17.5 | 2.3 | - | 92.258 | 12.3 | - |
| **Beta Mercaptoethanol** | | | | | | |
| water | 17.5 | 2.3 | - | 92.258 | 12.3 | - |
| 2-Mercaptoethanol | 0.98 | 0.13 | - | - | - | - |
| **XL1-Blue Supercompetent Cells** | | | | | | |
| water | 17.5 | 2.3 | - | 92.258 | 12.3 | - |
| Dimethyl sulfoxide | 0.42 | 0.056 | EU A.4 | - | - | - |

**Relative vapor density** :
XL1-Red Competent Cells — Not available.
pUC 18 DNA Control Plasmid — Not available.
Beta Mercaptoethanol — Not available.
XL1-Blue Supercompetent Cells — Not available.

**Relative density** :
XL1-Red Competent Cells — Not available.
pUC 18 DNA Control Plasmid — Not available.
Beta Mercaptoethanol — Not available.
XL1-Blue Supercompetent Cells — Not available.

# Section 9. Physical and chemical properties and safety characteristics

**Solubility(ies)** :

| Media | Result |
|---|---|
| **XL1-Red Competent Cells** | |
| water | Soluble |
| **pUC 18 DNA Control Plasmid** | |
| water | Soluble |
| **Beta Mercaptoethanol** | |
| water | Soluble |
| **XL1-Blue Supercompetent Cells** | |
| water | Soluble |

**Partition coefficient: n-octanol/water** :

| | |
|---|---|
| XL1-Red Competent Cells | Not applicable. |
| pUC 18 DNA Control Plasmid | Not applicable. |
| Beta Mercaptoethanol | Not applicable. |
| XL1-Blue Supercompetent Cells | Not applicable. |

**Auto-ignition temperature** :

| Ingredient name | °C | °F | Method |
|---|---|---|---|
| **XL1-Red Competent Cells** | | | |
| Dimethyl sulfoxide | 300 to 302 | 572 to 575.6 | - |
| Glycerol | 370 | 698 | - |
| **Beta Mercaptoethanol** | | | |
| 2-Mercaptoethanol | 295 | 563 | - |
| **XL1-Blue Supercompetent Cells** | | | |
| Dimethyl sulfoxide | 300 to 302 | 572 to 575.6 | - |
| Glycerol | 370 | 698 | - |

**Decomposition temperature** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Viscosity** :

| | |
|---|---|
| XL1-Red Competent Cells | Not available. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Not available. |
| XL1-Blue Supercompetent Cells | Not available. |

**Particle characteristics**

**Median particle size** :

| | |
|---|---|
| XL1-Red Competent Cells | Not applicable. |
| pUC 18 DNA Control Plasmid | Not applicable. |
| Beta Mercaptoethanol | Not applicable. |
| XL1-Blue Supercompetent Cells | Not applicable. |

# Section 10. Stability and reactivity

**10.1 Reactivity** :

| | |
|---|---|
| XL1-Red Competent Cells | No specific test data related to reactivity available for this product or its ingredients. |
| pUC 18 DNA Control Plasmid | No specific test data related to reactivity available for this product or its ingredients. |
| Beta Mercaptoethanol | No specific test data related to reactivity available for this product or its ingredients. |
| XL1-Blue Supercompetent Cells | No specific test data related to reactivity available for this product or its ingredients. |

# Section 10. Stability and reactivity

**10.2 Chemical stability** :

| | |
|---|---|
| XL1-Red Competent Cells | The product is stable. |
| pUC 18 DNA Control Plasmid | The product is stable. |
| Beta Mercaptoethanol | The product is stable. |
| XL1-Blue Supercompetent Cells | The product is stable. |

**10.3 Possibility of hazardous reactions** :

| | |
|---|---|
| XL1-Red Competent Cells | Under normal conditions of storage and use, hazardous reactions will not occur. |
| pUC 18 DNA Control Plasmid | Under normal conditions of storage and use, hazardous reactions will not occur. |
| Beta Mercaptoethanol | Under normal conditions of storage and use, hazardous reactions will not occur. |
| XL1-Blue Supercompetent Cells | Under normal conditions of storage and use, hazardous reactions will not occur. |

**10.4 Conditions to avoid** :

| | |
|---|---|
| XL1-Red Competent Cells | No specific data. |
| pUC 18 DNA Control Plasmid | No specific data. |
| Beta Mercaptoethanol | No specific data. |
| XL1-Blue Supercompetent Cells | No specific data. |

**10.5 Incompatible materials** :

| | |
|---|---|
| XL1-Red Competent Cells | May react or be incompatible with oxidizing materials. |
| pUC 18 DNA Control Plasmid | May react or be incompatible with oxidizing materials. |
| Beta Mercaptoethanol | May react or be incompatible with oxidizing materials. |
| XL1-Blue Supercompetent Cells | May react or be incompatible with oxidizing materials. |

**10.6 Hazardous decomposition products** :

| | |
|---|---|
| XL1-Red Competent Cells | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| pUC 18 DNA Control Plasmid | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| Beta Mercaptoethanol | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| XL1-Blue Supercompetent Cells | 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 |
|---|---|---|---|---|
| **XL1-Red Competent Cells** | | | | |
| Glycerol | LD50 Oral | Rat | 12600 mg/kg | - |
| Dimethyl sulfoxide | LD50 Dermal | Rat | 40000 mg/kg | - |
| | LD50 Oral | Rat | 14500 mg/kg | - |
| Potassium chloride | LD50 Oral | Rat | 2600 mg/kg | - |
| **Beta Mercaptoethanol** | | | | |
| 2-Mercaptoethanol | LD50 Oral | Rat | 244 mg/kg | - |
| **XL1-Blue Supercompetent Cells** | | | | |

# Section 11. Toxicological information

| | | | | |
|---|---|---|---|---|
| Glycerol | LD50 Oral | Rat | 12600 mg/kg | - |
| Dimethyl sulfoxide | LD50 Dermal | Rat | 40000 mg/kg | - |
| | LD50 Oral | Rat | 14500 mg/kg | - |
| Potassium chloride | LD50 Oral | Rat | 2600 mg/kg | - |

## Irritation/Corrosion

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| **XL1-Red Competent Cells** | | | | | |
| Glycerol | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| Dimethyl sulfoxide | Eyes - Mild irritant | Rabbit | - | 100 mg | - |
| | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| | Skin - Mild irritant | Rabbit | - | 100 mg | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| Potassium chloride | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| **Beta Mercaptoethanol** | | | | | |
| 2-Mercaptoethanol | Eyes - Severe irritant | Rabbit | - | 2 mg | - |
| **XL1-Blue Supercompetent Cells** | | | | | |
| Glycerol | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| Dimethyl sulfoxide | Eyes - Mild irritant | Rabbit | - | 100 mg | - |
| | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| | Skin - Mild irritant | Rabbit | - | 100 mg | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 mg | - |
| Potassium chloride | Eyes - Mild irritant | Rabbit | - | 24 hours 500 mg | - |

## Sensitization

Not available.

## Mutagenicity

**Conclusion/Summary** : Not available.

## Carcinogenicity

**Conclusion/Summary** : Not available.

## Reproductive toxicity

**Conclusion/Summary** : Not available.

## Teratogenicity

**Conclusion/Summary** : Not available.

## Specific target organ toxicity (single exposure)

| Name | Category | Route of exposure | Target organs |
|---|---|---|---|
| **Beta Mercaptoethanol**<br>2-Mercaptoethanol | Category 3 | - | Respiratory tract irritation |

# Section 11. Toxicological information

## Specific target organ toxicity (repeated exposure)

| Name | Category | Route of exposure | Target organs |
|---|---|---|---|
| **Beta Mercaptoethanol**<br>2-Mercaptoethanol | Category 2 | oral | heart, liver |

## Aspiration hazard

Not available.

**Information on the likely routes of exposure** :

| | |
|---|---|
| XL1-Red Competent Cells | Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes. |
| pUC 18 DNA Control Plasmid | Not available. |
| Beta Mercaptoethanol | Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes. |
| XL1-Blue Supercompetent Cells | Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes. |

## Potential acute health effects

**Eye contact** :

| | |
|---|---|
| XL1-Red Competent Cells | Causes eye irritation. |
| pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| Beta Mercaptoethanol | Causes serious eye damage. |
| XL1-Blue Supercompetent Cells | Causes eye irritation. |

**Inhalation** :

| | |
|---|---|
| XL1-Red Competent Cells | No known significant effects or critical hazards. |
| pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| Beta Mercaptoethanol | No known significant effects or critical hazards. |
| XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |

**Skin contact** :

| | |
|---|---|
| XL1-Red Competent Cells | No known significant effects or critical hazards. |
| pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| Beta Mercaptoethanol | Harmful in contact with skin. Causes skin irritation. May cause an allergic skin reaction. |
| XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |

**Ingestion** :

| | |
|---|---|
| XL1-Red Competent Cells | No known significant effects or critical hazards. |
| pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| Beta Mercaptoethanol | No known significant effects or critical hazards. |
| XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |

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

**Eye contact** :

| | |
|---|---|
| XL1-Red Competent Cells | Adverse symptoms may include the following:<br>irritation<br>watering<br>redness |
| pUC 18 DNA Control Plasmid | No specific data. |
| Beta Mercaptoethanol | Adverse symptoms may include the following:<br>pain<br>watering<br>redness |
| XL1-Blue Supercompetent Cells | Adverse symptoms may include the following:<br>irritation<br>watering<br>redness |

**Inhalation** :

| | |
|---|---|
| XL1-Red Competent Cells | No specific data. |
| pUC 18 DNA Control Plasmid | No specific data. |
| Beta Mercaptoethanol | Adverse symptoms may include the following:<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| XL1-Blue Supercompetent Cells | No specific data. |

# Section 11. Toxicological information

| | | | |
|---|---|---|---|
| **Skin contact** | : | XL1-Red Competent Cells | No specific data. |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>pain or irritation<br>redness<br>blistering may occur<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| | | XL1-Blue Supercompetent Cells | No specific data. |
| **Ingestion** | : | XL1-Red Competent Cells | No specific data. |
| | | pUC 18 DNA Control Plasmid | No specific data. |
| | | Beta Mercaptoethanol | Adverse symptoms may include the following:<br>stomach pains<br>reduced fetal weight<br>increase in fetal deaths<br>skeletal malformations |
| | | XL1-Blue Supercompetent Cells | 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** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |
| **Carcinogenicity** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | No known significant effects or critical hazards. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |
| **Mutagenicity** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | No known significant effects or critical hazards. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |
| **Reproductive toxicity** | : | XL1-Red Competent Cells | No known significant effects or critical hazards. |
| | | pUC 18 DNA Control Plasmid | No known significant effects or critical hazards. |
| | | Beta Mercaptoethanol | Suspected of damaging fertility or the unborn child. |
| | | XL1-Blue Supercompetent Cells | No known significant effects or critical hazards. |

## Numerical measures of toxicity

### Acute toxicity estimates

# Section 11. Toxicological information

| Product/ingredient name | Oral (mg/kg) | Dermal (mg/kg) | Inhalation (gases) (ppm) | Inhalation (vapors) (mg/l) | Inhalation (dusts and mists) (mg/l) |
|---|---|---|---|---|---|
| **XL1-Red Competent Cells** | | | | | |
| XL1-Red Competent Cells | 136842.1 | N/A | N/A | N/A | N/A |
| Glycerol | 12600 | N/A | N/A | N/A | N/A |
| Dimethyl sulfoxide | 14500 | 40000 | N/A | N/A | N/A |
| Potassium chloride | 2600 | N/A | N/A | N/A | N/A |
| **Beta Mercaptoethanol** | | | | | |
| Beta Mercaptoethanol | 2440.0 | 2000 | N/A | 30 | N/A |
| 2-Mercaptoethanol | 244 | 200 | N/A | 3 | N/A |
| **XL1-Blue Supercompetent Cells** | | | | | |
| XL1-Blue Supercompetent Cells | 136842.1 | N/A | N/A | N/A | N/A |
| Glycerol | 12600 | N/A | N/A | N/A | N/A |
| Dimethyl sulfoxide | 14500 | 40000 | N/A | N/A | N/A |
| Potassium chloride | 2600 | N/A | N/A | N/A | N/A |

# Section 12. Ecological information

## 12.1 Toxicity

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| **XL1-Red Competent Cells** | | | |
| Glycerol | Acute LC50 54000 mg/l Fresh water | Fish - *Oncorhynchus mykiss* | 96 hours |
| Dimethyl sulfoxide | Acute LC50 25000 ppm Fresh water | Daphnia - *Daphnia magna* - Neonate | 48 hours |
| | Acute LC50 34000000 µg/l Fresh water | Fish - *Pimephales promelas* | 96 hours |
| | Chronic NOEC 100 ul/L Marine water | Algae - *Ulva lactuca* | 72 hours |
| | Chronic NOEC 100 ul/L Fresh water | Daphnia - *Daphnia magna* - Juvenile (Fledgling, Hatchling, Weanling) | 21 days |
| Potassium chloride | Acute EC50 9.24 g/L Fresh water | Algae - *Desmodesmus subspicatus* | 72 hours |
| | Acute EC50 1337000 µg/l Fresh water | Algae - *Navicula seminulum* | 96 hours |
| | Acute LC50 9.68 mg/l Fresh water | Crustaceans - *Pseudosida ramosa* - Neonate | 48 hours |
| | Acute LC50 93000 µg/l Fresh water | Daphnia - *Daphnia magna* | 48 hours |
| | Acute LC50 509.65 mg/l Fresh water | Fish - *Danio rerio* | 96 hours |
| **XL1-Blue Supercompetent Cells** | | | |
| Glycerol | Acute LC50 54000 mg/l Fresh water | Fish - *Oncorhynchus mykiss* | 96 hours |
| Dimethyl sulfoxide | Acute LC50 25000 ppm Fresh water | Daphnia - *Daphnia magna* - Neonate | 48 hours |
| | Acute LC50 34000000 µg/l Fresh water | Fish - *Pimephales promelas* | 96 hours |
| | Chronic NOEC 100 ul/L Marine water | Algae - *Ulva lactuca* | 72 hours |
| | Chronic NOEC 100 ul/L Fresh water | Daphnia - *Daphnia magna* - Juvenile (Fledgling, Hatchling, Weanling) | 21 days |
| Potassium chloride | Acute EC50 9.24 g/L Fresh water | Algae - *Desmodesmus subspicatus* | 72 hours |
| | Acute EC50 1337000 µg/l Fresh water | Algae - *Navicula seminulum* | 96 hours |
| | Acute LC50 9.68 mg/l Fresh water | Crustaceans - *Pseudosida* | 48 hours |

# Section 12. Ecological information

| | | | |
|---|---|---|---|
| | Acute LC50 93000 µg/l Fresh water<br>Acute LC50 509.65 mg/l Fresh water | *ramosa* - Neonate<br>Daphnia - *Daphnia magna*<br>Fish - *Danio rerio* | <br>48 hours<br>96 hours |

## 12.2 Persistence and degradability

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| **XL1-Red Competent Cells** | | | | |
| Glycerol | 301D Ready Biodegradability - Closed Bottle Test | 93 % - 30 days | - | - |
| Dimethyl sulfoxide | OECD 301D Ready Biodegradability - Closed Bottle Test | 31 % - Not readily - 28 days | - | - |
| **Beta Mercaptoethanol** | | | | |
| 2-Mercaptoethanol | OECD 310 Ready Biodegradability - $CO_2$ in Sealed Vessels (Headspace Test) | 69 % - Not readily - 60 days | 20 mg/l | - |
| **XL1-Blue Supercompetent Cells** | | | | |
| Glycerol | 301D Ready Biodegradability - Closed Bottle Test | 93 % - 30 days | - | - |
| Dimethyl sulfoxide | OECD 301D Ready Biodegradability - Closed Bottle Test | 31 % - Not readily - 28 days | - | - |

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| **XL1-Red Competent Cells** | | | |
| Dimethyl sulfoxide | - | - | Not readily |
| Potassium chloride | - | - | Readily |
| **Beta Mercaptoethanol** | | | |
| 2-Mercaptoethanol | - | - | Not readily |
| **XL1-Blue Supercompetent Cells** | | | |
| Dimethyl sulfoxide | - | - | Not readily |
| Potassium chloride | - | - | Readily |

## 12.3 Bioaccumulative potential

# Section 12. Ecological information

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| **XL1-Red Competent Cells** | | | |
| Glycerol | -1.76 | - | Low |
| Dimethyl sulfoxide | -1.35 | 3.16 | Low |
| Potassium chloride | -0.46 | - | Low |
| **Beta Mercaptoethanol** | | | |
| 2-Mercaptoethanol | -0.056 | - | Low |
| **XL1-Blue Supercompetent Cells** | | | |
| Glycerol | -1.76 | - | Low |
| Dimethyl sulfoxide | -1.35 | 3.16 | Low |
| Potassium chloride | -0.46 | - | Low |

### 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 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.

# Section 14. Transport information

**Transport in bulk according to IMO instruments** : 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) CDR Exempt/Partial exemption**: Not determined

**Clean Water Act (CWA) 311**: Edetic acid

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : 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** :

| | |
|---|---|
| XL1-Red Competent Cells | EYE IRRITATION - Category 2B |
| pUC 18 DNA Control Plasmid | Not applicable. |
| Beta Mercaptoethanol | ACUTE TOXICITY (dermal) - Category 4<br>SKIN IRRITATION - Category 2<br>SERIOUS EYE DAMAGE - Category 1<br>SKIN SENSITIZATION - Category 1<br>TOXIC TO REPRODUCTION - Category 2<br>SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) Category 2 |
| XL1-Blue Supercompetent Cells | EYE IRRITATION - Category 2B |

**Composition/information on ingredients**

| Name | % | Classification |
|---|---|---|
| **XL1-Red Competent Cells** | | |
| Glycerol | ≥10 - ≤25 | EYE IRRITATION - Category 2B |
| Dimethyl sulfoxide | ≤10 | FLAMMABLE LIQUIDS - Category 4<br>EYE IRRITATION - Category 2B |
| Sucrose | ≤10 | COMBUSTIBLE DUSTS |
| Potassium chloride | ≤3 | EYE IRRITATION - Category 2B |
| **Beta Mercaptoethanol** | | |
| 2-Mercaptoethanol | ≤12 | FLAMMABLE LIQUIDS - Category 4<br>ACUTE TOXICITY (oral) - Category 3<br>ACUTE TOXICITY (dermal) - Category 2<br>ACUTE TOXICITY (inhalation) - Category 3<br>SKIN IRRITATION - Category 2<br>SERIOUS EYE DAMAGE - Category 1<br>SKIN SENSITIZATION - Category 1A<br>TOXIC TO REPRODUCTION - Category 2<br>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3<br>SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 |
| **XL1-Blue Supercompetent** | | |

# Section 15. Regulatory information

| | | |
|---|---|---|
| **Cells** | | |
| Glycerol | ≥10 - ≤25 | EYE IRRITATION - Category 2B |
| Dimethyl sulfoxide | ≤10 | FLAMMABLE LIQUIDS - Category 4<br>EYE IRRITATION - Category 2B |
| Sucrose | ≤10 | COMBUSTIBLE DUSTS |
| Potassium chloride | ≤3 | EYE IRRITATION - Category 2B |

## State regulations

**Massachusetts** : The following components are listed: GLYCERINE MIST; SUCROSE DUST; 2-MERCAPTOETHANOL

**New York** : None of the components are listed.

**New Jersey** : The following components are listed: GLYCERIN; DIMETHYL SULFOXIDE; METHANE, SULFINYLBIS-; THIOGLYCOL

**Pennsylvania** : The following components are listed: 1,2,3-PROPANETRIOL; .ALPHA.-D-GLUCOPYRANOSIDE, .BETA.-D-FRUCTOFURANOSYL; ETHANOL, 2-MERCAPTO-

## California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

## International regulations

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

Not listed.

### Montreal Protocol

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** : All components are listed or exempted.

**Canada** : All components are listed or exempted.

**China** : Not determined.

**Japan** : **Japan inventory (CSCL)**: Not determined.
**Japan inventory (ISHL)**: All components are listed or exempted.

**New Zealand** : Not determined.

**Philippines** : Not determined.

**Republic of Korea** : All components are listed or exempted.

**Taiwan** : All components are listed or exempted.

**Thailand** : Not determined.

**Turkey** : Not determined.

**United States** : All components are active or exempted.

**Viet Nam** : All components are listed or exempted.

# Section 16. Other information

## Procedure used to derive the classification

| Classification | Justification |
|---|---|
| **XL1-Red Competent Cells** | |
| EYE IRRITATION - Category 2B | Calculation method |
| **Beta Mercaptoethanol** | |
| ACUTE TOXICITY (dermal) - Category 4 | Calculation method |
| SKIN IRRITATION - Category 2 | Calculation method |
| SERIOUS EYE DAMAGE - Category 1 | Calculation method |
| SKIN SENSITIZATION - Category 1 | Calculation method |
| TOXIC TO REPRODUCTION - Category 2 | Calculation method |
| SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 | Calculation method |
| AQUATIC HAZARD (LONG-TERM) - Category 3 | Calculation method |
| **XL1-Blue Supercompetent Cells** | |
| EYE IRRITATION - Category 2B | Calculation method |

## History

**Date of issue/Date of revision** : 01/05/2024

**Date of previous issue** : 12/03/2020

**Version** : 8

**Key to abbreviations** : 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
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
UN = United Nations

**Indicates information that has changed from previously issued version.**

## Notice to reader

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