



## Section 2. Hazards identification

**Ingredients of unknown toxicity** : BL21 competent cells

Percentage of the mixture consisting of ingredient (s) of unknown dermal toxicity: 1 - 10%  
Percentage of the mixture consisting of ingredient (s) of unknown inhalation toxicity: 10 - 30%

### 2.2 GHS label elements

**Hazard pictograms** : Beta Mercaptoethanol



**Signal word** : BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Warning  
No signal word.  
Danger

**Hazard statements** : BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

H320 - Causes eye irritation.  
No known significant effects or critical hazards.  
H312 + H332 - Harmful in contact with skin or if inhaled.  
H318 - Causes serious eye damage.  
H315 - Causes skin irritation.  
H317 - May cause an allergic skin reaction.

### Precautionary statements

**Prevention** : BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

P264 - Wash hands thoroughly after handling.  
Not applicable.  
P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.  
P271 - Use only outdoors or in a well-ventilated area.  
P261 - Avoid breathing vapor.  
P264 - Wash hands thoroughly after handling.  
P272 (OSHA) - Contaminated work clothing must not be allowed out of the workplace.

**Response** : BL21 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.  
P337 + P313 - If eye irritation persists: Get medical attention.

pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Not applicable.  
P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.  
P302 + P352 + P312 + P363 - IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Wash contaminated clothing before reuse.  
P333 + P313 - If skin irritation or rash occurs: Get medical attention.  
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 physician.

**Storage** : BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Not applicable.  
Not applicable.  
Not applicable.

## Section 2. Hazards identification

<b>Disposal</b>	: <input checked="" type="checkbox"/> BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Supplemental label elements</b>	: <input checked="" type="checkbox"/> BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	None known. None known. None known.
<b>2.3 Other hazards</b>		
<b>Hazards not otherwise classified</b>	: <input checked="" type="checkbox"/> BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	None known. None known. None known.

## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	: <input checked="" type="checkbox"/> BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Mixture Mixture Mixture
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Ingredient name	%	CAS number
<input checked="" type="checkbox"/> BL21 competent cells		
Glycerol	≥10 - ≤25	56-81-5
Dimethyl sulfoxide	≤10	67-68-5
Potassium chloride	≤3	7447-40-7
<b>Beta Mercaptoethanol</b>		
2-Mercaptoethanol	≤12	60-24-2

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

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

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

## Section 4. First aid measures

### 4.1 Description of necessary first aid measures

<b>Eye contact</b>	: <input checked="" type="checkbox"/> BL21 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.

## Section 4. First aid measures

<b>Inhalation</b>	: BL21 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 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.
<b>Skin contact</b>	: BL21 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.
<b>Ingestion</b>	: BL21 competent cells	Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never

## Section 4. First aid measures

pUC 18 DNA Control Plasmid	<p>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.</p> <p>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.</p>
Beta Mercaptoethanol	<p>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.</p>

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

#### Potential acute health effects

<b>Eye contact</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	<p>Causes eye irritation.</p> <p>No known significant effects or critical hazards.</p> <p>Causes serious eye damage.</p>
<b>Inhalation</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>Harmful if inhaled.</p>
<b>Skin contact</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>Harmful in contact with skin. Causes skin irritation.</p> <p>May cause an allergic skin reaction.</p>
<b>Ingestion</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	<p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p> <p>No known significant effects or critical hazards.</p>

#### Over-exposure signs/symptoms

<b>Eye contact</b>	: BL21 competent cells	<p>Adverse symptoms may include the following:</p> <ul style="list-style-type: none"> <li>irritation</li> <li>watering</li> <li>redness</li> </ul>
	pUC 18 DNA Control Plasmid Beta Mercaptoethanol	<p>No specific data.</p> <p>Adverse symptoms may include the following:</p> <ul style="list-style-type: none"> <li>pain</li> <li>watering</li> <li>redness</li> </ul>

## Section 4. First aid measures

<b>Inhalation</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data. No specific data. No specific data.
<b>Skin contact</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Ingestion</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: stomach pains

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

<b>Notes to physician</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  Beta Mercaptoethanol	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
<b>Specific treatments</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific treatment. No specific treatment. No specific treatment.
<b>Protection of first-aiders</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  Beta Mercaptoethanol	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. No action shall be taken involving any personal risk or without suitable training. 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. Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  Beta Mercaptoethanol	Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire.
<b>Unsuitable extinguishing media</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	None known. None known. None known.

## Section 5. Fire-fighting measures

### 5.2 Special hazards arising from the substance or mixture

<b>Specific hazards arising from the chemical</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  Beta Mercaptoethanol	In a fire or if heated, a pressure increase will occur and the container may burst. In a fire or if heated, a pressure increase will occur and the container may burst. In a fire or if heated, a pressure increase will occur and the container may burst.
<b>Hazardous thermal decomposition products</b>	: BL21 competent cells    pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides halogenated compounds metal oxide/oxides No specific data. Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides

### 5.3 Advice for firefighters

<b>Special protective actions for fire-fighters</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  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. 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. 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.
<b>Special protective equipment for fire-fighters</b>	: BL21 competent cells  pUC 18 DNA Control Plasmid  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. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. 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

## Section 6. Accidental release measures

<b>For non-emergency personnel</b>	: BL21 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 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.
<b>For emergency responders</b>	: BL21 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". 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". 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".
<b>6.2 Environmental precautions</b>	: BL21 competent cells	<p>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).</p> <p>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).</p> <p>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).</p>
	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).

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



## Section 6. Accidental release measures

<b>Methods for cleaning up</b>	: BL21 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.

## Section 7. Handling and storage

### 7.1 Precautions for safe handling

<b>Protective measures</b>	: BL21 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. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. 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.
<b>Advice on general occupational hygiene</b>	: BL21 competent cells	Potentially biohazardous material. 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

## Section 7. Handling and storage

Beta Mercaptoethanol

for additional information on hygiene measures. 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

: BL21 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 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.

### 7.3 Specific end use(s)

#### Recommendations

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Industrial applications, Professional applications.  
Industrial applications, Professional applications.  
Industrial applications, Professional applications.

#### Industrial sector specific solutions

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Not applicable.  
Not applicable.  
Not applicable.

## Section 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
<b>BL21 competent cells</b> Glycerol	<b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 10 mg/m <sup>3</sup> 8 hours. Form: Total dust
	<b>OSHA PEL (United States, 6/2016).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 15 mg/m <sup>3</sup> 8 hours. Form: Total dust
Dimethyl sulfoxide	<b>AIHA WEEL (United States, 10/2011).</b> TWA: 250 ppm 8 hours.
Potassium chloride	None.
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	<b>AIHA WEEL (United States, 10/2011).</b> <b>Absorbed through skin.</b> TWA: 0.2 ppm 8 hours.

### 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 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.

## Section 8. Exposure controls/personal protection

- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Liquid. Liquid. Liquid.
<b>Color</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Odor</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Odor threshold</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>pH</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	6.4 7.5 Not available.
<b>Melting point</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. 0°C (32°F) Not available.
<b>Boiling point</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. 100°C (212°F) Not available.
<b>Flash point</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Evaporation rate</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Flammability (solid, gas)</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. Not applicable.
<b>Lower and upper explosive (flammable) limits</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Vapor pressure</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Vapor density</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.
<b>Relative density</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available.

## Section 9. Physical and chemical properties

<b>Solubility</b>	: BL21 competent cells	Soluble in the following materials: cold water and hot water.
	pUC 18 DNA Control Plasmid	Easily soluble in the following materials: cold water and hot water.
	Beta Mercaptoethanol	Easily soluble in the following materials: cold water and hot water.
<b>Partition coefficient: n-octanol/water</b>	: BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Auto-ignition temperature</b>	: BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Decomposition temperature</b>	: BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Viscosity</b>	: BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.

## Section 10. Stability and reactivity

<b>10.1 Reactivity</b>	: BL21 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.
<b>10.2 Chemical stability</b>	: BL21 competent cells	The product is stable.
	pUC 18 DNA Control Plasmid	The product is stable.
	Beta Mercaptoethanol	The product is stable.
<b>10.3 Possibility of hazardous reactions</b>	: BL21 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.
<b>10.4 Conditions to avoid</b>	: BL21 competent cells	No specific data.
	pUC 18 DNA Control Plasmid	No specific data.
	Beta Mercaptoethanol	No specific data.
<b>10.5 Incompatible materials</b>	: BL21 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.

## Section 10. Stability and reactivity

<b>10.6 Hazardous decomposition products</b>	: BL21 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.

## Section 11. Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
<b>BL21 competent cells</b>				
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	-
<b>Beta Mercaptoethanol</b>				
2-Mercaptoethanol	LD50 Dermal	Rabbit	200 mg/kg	-
	LD50 Oral	Rat	244 mg/kg	-

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
<b>BL21 competent cells</b>					
Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
Dimethyl sulfoxide	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	100 milligrams	-
Potassium chloride	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
<b>Beta Mercaptoethanol</b>					
2-Mercaptoethanol	Eyes - Severe irritant	Rabbit	-	2 milligrams	-

#### Sensitization

Not available.

#### Mutagenicity

Not available.

#### Carcinogenicity

Not available.

#### Reproductive toxicity

Not available.

## Section 11. Toxicological information

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Beta Mercaptoethanol 2-Mercaptoethanol	Category 3	Not applicable.	Respiratory tract irritation

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

### Information on the likely routes of exposure

: BL21 competent cells

Routes of entry anticipated: Oral, Dermal, Inhalation.

pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Not available.

Routes of entry anticipated: Oral, Dermal, Inhalation.

### Potential acute health effects

#### Eye contact

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

Causes eye irritation.

No known significant effects or critical hazards.  
Causes serious eye damage.

#### Inhalation

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No known significant effects or critical hazards.  
No known significant effects or critical hazards.  
Harmful if inhaled.

#### Skin contact

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No known significant effects or critical hazards.  
No known significant effects or critical hazards.  
Harmful in contact with skin. Causes skin irritation.  
May cause an allergic skin reaction.

#### Ingestion

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No known significant effects or critical hazards.  
No known significant effects or critical hazards.  
No known significant effects or critical hazards.

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

#### Eye contact

: BL21 competent cells

Adverse symptoms may include the following:  
irritation  
watering  
redness

pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No specific data.

Adverse symptoms may include the following:  
pain  
watering  
redness

#### Inhalation

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No specific data.

No specific data.

No specific data.

#### Skin contact

: BL21 competent cells  
pUC 18 DNA Control Plasmid  
Beta Mercaptoethanol

No specific data.

No specific data.

Adverse symptoms may include the following:  
pain or irritation  
redness  
blistering may occur

## Section 11. Toxicological information

<b>Ingestion</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: stomach pains
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### 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

<b>General</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
<b>Carcinogenicity</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Mutagenicity</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Teratogenicity</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Developmental effects</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Fertility effects</b>	: BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Route	ATE value
BL21 competent cells Oral	144778.9 mg/kg
Beta Mercaptoethanol Oral	2440 mg/kg
Dermal	2000 mg/kg
Inhalation (vapors)	20 mg/l



## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<b>BL21 competent cells</b> Glycerol Dimethyl sulfoxide  Potassium chloride	Acute LC50 54000 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	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 µl/L Marine water	Algae - Ulva lactuca	72 hours
	Acute EC50 1337000 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 9.24 g/L Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute EC50 141460 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 12.92 mg/l Fresh water	Crustaceans - Pseudosida ramosa - Neonate	48 hours
	Acute LC50 880000 µg/l Fresh water	Fish - Pimephales promelas	96 hours

### 12.2 Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
<b>BL21 competent cells</b> Potassium chloride	-	-	Readily

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>BL21 competent cells</b> Glycerol Dimethyl sulfoxide Potassium chloride	-1.76	-	low
	-1.35	3.16	low
	-0.46	-	low
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	-0.056	-	low

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : 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.

## Section 13. Disposal considerations

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

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

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

## Section 14. Transport information

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

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

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

## Section 15. Regulatory information

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

**U.S. Federal regulations** : TSCA 8(a) 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

<b>Classification</b>	: <input checked="" type="checkbox"/> BL21 competent cells	Immediate (acute) health hazard
	pUC 18 DNA Control Plasmid	Not applicable.
	Beta Mercaptoethanol	Immediate (acute) health hazard

#### Composition/information on ingredients

## Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
<b>BL21 competent cells</b>						
Glycerol	≥10 - ≤25	No.	No.	No.	Yes.	No.
Dimethyl sulfoxide	≤10	Yes.	No.	No.	Yes.	No.
Potassium chloride	≤3	No.	No.	No.	Yes.	No.
<b>Beta Mercaptoethanol</b>						
2-Mercaptoethanol	≤12	Yes.	No.	No.	Yes.	No.

### 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; 1,2,3-PROPANETRIOL; DIMETHYL SULFOXIDE; METHANE, SULFINYLBI-; THIOGLYCOL; 2-MERCAPTOETHANOL
- Pennsylvania** : The following components are listed: 1,2,3-PROPANETRIOL; .ALPHA.-D-GLUCOPYRANOSIDE, .BETA.-D-FRUCTOFURANOSYL; ETHANOL, 2-MERCAPTO-

### International regulations

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

Not listed.

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

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

#### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

### Inventory list

- Australia** : All components are listed or exempted.
- Canada** : All components are listed or exempted.
- China** : Not determined.
- Europe** : All components are listed or exempted.
- Japan** :  **Japan inventory (ENCS)**: Not determined.  
**Japan inventory (ISHL)**: All components are listed or exempted.
- 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.
- Thailand** :  Not determined.
- Turkey** :  Not determined.
- United States** : All components are listed or exempted.
- Viet Nam** :  Not determined.

## Section 16. Other information

### History

**Date of issue** : 10/30/2017  
**Date of previous issue** : 10/13/2015.  
**Version** : 5

✔ Indicates information that has changed from previously issued version.

### Notice to reader

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