

Section 2. Hazard(s) identification

Precautionary statements

Prevention	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P261 - Avoid breathing vapour. P264 - Wash hands thoroughly after handling. P272 - Contaminated work clothing should not be allowed out of the workplace.
Response	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P302 + P352 + P312 + P362 + P363 - IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Take off contaminated clothing. 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(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. Not applicable.
Disposal	: BL21(DE3) 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.
Supplemental label elements		
Additional warning phrases	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. Not applicable.
Other hazards which do not result in classification	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	None known. None known. None known.

Section 3. Composition and ingredient information

Substance/mixture	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Mixture Mixture Mixture
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CAS number/other identifiers

Section 3. Composition and ingredient information

Ingredient name	% (w/w)	CAS number
BL21(DE3) competent cells		
Glycerol	≥10 - ≤30	56-81-5
Dimethyl sulfoxide	≤10	67-68-5
Sucrose	≤10	57-50-1
Beta Mercaptoethanol		
2-Mercaptoethanol	≤12	60-24-2

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

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: BL21(DE3) competent cells	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
	pUC 18 DNA Control Plasmid	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
	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.
Inhalation	: BL21(DE3) competent cells	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	pUC 18 DNA Control Plasmid	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	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.
Skin contact	: BL21(DE3) competent cells	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	pUC 18 DNA Control Plasmid	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	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.

Section 4. First aid measures

		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.
Ingestion	: BL21(DE3) competent cells	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.
	pUC 18 DNA Control Plasmid	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.
	Beta Mercaptoethanol	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.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. Causes serious eye damage.
Inhalation	: BL21(DE3) 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(DE3) 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(DE3) 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.

Over-exposure signs/symptoms

Eye contact	: BL21(DE3) competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: pain watering redness
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Section 4. First aid measures

Inhalation	: BL21(DE3) competent cells	No specific data.
	pUC 18 DNA Control Plasmid	No specific data.
	Beta Mercaptoethanol	No specific data.
Skin contact	: BL21(DE3) competent cells	No specific data.
	pUC 18 DNA Control Plasmid	No specific data.
	Beta Mercaptoethanol	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	: BL21(DE3) competent cells	No specific data.
	pUC 18 DNA Control Plasmid	No specific data.
	Beta Mercaptoethanol	Adverse symptoms may include the following: stomach pains

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

Notes to physician	: BL21(DE3) 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.
Specific treatments	: BL21(DE3) competent cells	No specific treatment.
	pUC 18 DNA Control Plasmid	No specific treatment.
	Beta Mercaptoethanol	No specific treatment.
Protection of first-aiders	: BL21(DE3) competent cells	No action shall be taken involving any personal risk or without suitable training.
	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 apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Firefighting measures

Extinguishing media

Suitable extinguishing media	: BL21(DE3) 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.
Unsuitable extinguishing media	: BL21(DE3) competent cells	None known.
	pUC 18 DNA Control Plasmid	None known.
	Beta Mercaptoethanol	None known.

Section 5. Firefighting measures

Specific hazards arising from the chemical	: BL21(DE3) 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.
Hazardous thermal decomposition products	: BL21(DE3) competent cells	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides halogenated compounds metal oxide/oxides
	pUC 18 DNA Control Plasmid	No specific data.
	Beta Mercaptoethanol	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides
Special protective actions for fire-fighters	: BL21(DE3) 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.
Special protective equipment for fire-fighters	: BL21(DE3) 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.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: BL21(DE3) competent cells	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Put on appropriate personal protective equipment.
	pUC 18 DNA Control Plasmid	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk

Section 6. Accidental release measures

Beta Mercaptoethanol

through spilt material. Put on appropriate personal protective equipment.

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

For emergency responders : BL21(DE3) competent cells

If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

pUC 18 DNA Control Plasmid

If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Beta Mercaptoethanol

If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : BL21(DE3) competent cells

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

pUC 18 DNA Control Plasmid

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Beta Mercaptoethanol

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and material for containment and cleaning up

Methods for cleaning up : BL21(DE3) 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

Precautions for safe handling

Protective measures	: BL21(DE3) competent cells	Put on appropriate personal protective equipment (see Section 8).
	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 vapour or mist. Do not ingest. Avoid release to the environment. 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.

Advice on general occupational hygiene	: BL21(DE3) 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.

Conditions for safe storage, including any incompatibilities	: BL21(DE3) competent cells	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for

Section 7. Handling and storage

Beta Mercaptoethanol

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

Section 8. Exposure controls and personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
BL21(DE3) competent cells Glycerol Dimethyl sulfoxide Sucrose	Safe Work Australia (Australia, 1/2014). TWA: 10 mg/m ³ 8 hours. DFG MAC-values list (Germany, 7/2015). Absorbed through skin. PEAK: 320 mg/m ³ , 4 times per shift, 15 minutes. TWA: 160 mg/m ³ 8 hours. PEAK: 100 ppm, 4 times per shift, 15 minutes. TWA: 50 ppm 8 hours. Safe Work Australia (Australia, 1/2014). TWA: 10 mg/m ³ 8 hours.

Appropriate engineering controls

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

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

: Handle as biohazard material (Biosafety level 1). Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

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

Section 8. Exposure controls and personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

- Physical state** : BL21(DE3) competent cells Liquid.
pUC 18 DNA Control Plasmid Liquid.
Beta Mercaptoethanol Liquid.
- Colour** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Odour** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Odour threshold** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- pH** : BL21(DE3) competent cells 6.4
pUC 18 DNA Control Plasmid 7.5
Beta Mercaptoethanol Not available.
- Melting point** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid 0°C (32°F)
Beta Mercaptoethanol Not available.
- Boiling point** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid 100°C (212°F)
Beta Mercaptoethanol Not available.
- Flash point** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Evaporation rate** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Flammability (solid, gas)** : BL21(DE3) competent cells Not applicable.
pUC 18 DNA Control Plasmid Not applicable.
Beta Mercaptoethanol Not applicable.
- Lower and upper explosive (flammable) limits** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Vapour pressure** : BL21(DE3) competent cells Not available.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Not available.
- Vapour density** :

Section 9. Physical and chemical properties

		BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.
Relative density	:	BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.
Solubility	:	BL21(DE3) 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.
Partition coefficient: n-octanol/water	:	BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.
Auto-ignition temperature	:	BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.
Decomposition temperature	:	BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.
Viscosity	:	BL21(DE3) competent cells	Not available.
		pUC 18 DNA Control Plasmid	Not available.
		Beta Mercaptoethanol	Not available.

Section 10. Stability and reactivity

Reactivity	:	BL21(DE3) 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.
Chemical stability	:	BL21(DE3) competent cells	The product is stable.
		pUC 18 DNA Control Plasmid	The product is stable.
		Beta Mercaptoethanol	The product is stable.
Possibility of hazardous reactions	:	BL21(DE3) 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.
Conditions to avoid	:	BL21(DE3) competent cells	No specific data.
		pUC 18 DNA Control Plasmid	No specific data.
		Beta Mercaptoethanol	No specific data.
Incompatible materials	:	BL21(DE3) competent cells	May react or be incompatible with oxidising materials.
		pUC 18 DNA Control Plasmid	May react or be incompatible with oxidising materials.
		Beta Mercaptoethanol	May react or be incompatible with oxidising materials.

Section 10. Stability and reactivity

Hazardous decomposition products	: BL21(DE3) 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

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
BL21(DE3) competent cells				
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
Dimethyl sulfoxide	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Sucrose	LD50 Oral	Rat	29700 mg/kg	-
Beta Mercaptoethanol				
2-Mercaptoethanol	LD50 Dermal	Rabbit	200 mg/kg	-
	LD50 Oral	Rat	244 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
BL21(DE3) competent cells					
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	-
Beta Mercaptoethanol					
2-Mercaptoethanol	Eyes - Severe irritant	Rabbit	-	2 milligrams	-

Sensitisation

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Section 11. Toxicological information

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 likely routes of exposure : BL21(DE3) competent cells Routes of entry anticipated: Oral, Dermal, Inhalation.
pUC 18 DNA Control Plasmid Not available.
Beta Mercaptoethanol Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : BL21(DE3) competent cells No known significant effects or critical hazards.
pUC 18 DNA Control Plasmid No known significant effects or critical hazards.
Beta Mercaptoethanol Causes serious eye damage.

Inhalation : BL21(DE3) competent cells No known significant effects or critical hazards.
pUC 18 DNA Control Plasmid No known significant effects or critical hazards.
Beta Mercaptoethanol Harmful if inhaled.

Skin contact : BL21(DE3) 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.

Ingestion : BL21(DE3) 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.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : BL21(DE3) competent cells No specific data.
pUC 18 DNA Control Plasmid No specific data.
Beta Mercaptoethanol Adverse symptoms may include the following:
pain
watering
redness

Inhalation : BL21(DE3) competent cells No specific data.
pUC 18 DNA Control Plasmid No specific data.
Beta Mercaptoethanol No specific data.

Skin contact : BL21(DE3) competent cells No specific data.
pUC 18 DNA Control Plasmid No specific data.
Beta Mercaptoethanol Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : BL21(DE3) competent cells No specific data.
pUC 18 DNA Control Plasmid No specific data.
Beta Mercaptoethanol Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Section 11. Toxicological information

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General	: <input checked="" type="checkbox"/> BL21(DE3) 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.
Carcinogenicity	: <input checked="" type="checkbox"/> BL21(DE3) 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.
Mutagenicity	: <input checked="" type="checkbox"/> BL21(DE3) 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.
Teratogenicity	: <input checked="" type="checkbox"/> BL21(DE3) 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.
Developmental effects	: <input checked="" type="checkbox"/> BL21(DE3) 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.
Fertility effects	: <input checked="" type="checkbox"/> BL21(DE3) 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
<input checked="" type="checkbox"/> Beta Mercaptoethanol	
Oral	2440 mg/kg
Dermal	2000 mg/kg
Inhalation (vapours)	20 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
<input checked="" type="checkbox"/> BL21(DE3) competent cells	Acute LC50 54000 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Glycerol	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
Dimethyl sulfoxide	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 100 ul/L Marine water	Algae - Ulva lactuca	72 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
<input checked="" type="checkbox"/> BL21(DE3) competent cells	301D Ready Biodegradability - Closed Bottle Test	93 % - 30 days	-	-
Glycerol				

Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
BL21(DE3) competent cells			
Glycerol	-1.76	-	low
Dimethyl sulfoxide	-1.35	3.16	low
Sucrose	-3.7	-	low
Beta Mercaptoethanol			
2-Mercaptoethanol	-0.056	-	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

ADG / IMDG / IATA : Not regulated as Dangerous Goods according to the ADG Code .

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

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

Section 15. Regulatory information

Standard Uniform Schedule of Medicine and Poisons

6

Model Work Health and Safety Regulations - Scheduled Substances

No listed substance

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.

Section 15. Regulatory information

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	: <input checked="" type="checkbox"/> 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	: <input checked="" type="checkbox"/> Not determined.
Turkey	: <input checked="" type="checkbox"/> Not determined.
United States	: All components are listed or exempted.
Viet Nam	: <input checked="" type="checkbox"/> Not determined.

Section 16. Any other relevant information

History

Date of issue/Date of revision	: 22/12/2017
Date of previous issue	: 13/10/2015.
Version	: 5

Key to abbreviations

: ADG = Australian Dangerous Goods
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NOHSC = National Occupational Health and Safety Commission
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations

Procedure used to derive the classification

Classification	Justification
<input checked="" type="checkbox"/> Beta Mercaptoethanol Acute Tox. 4, H312 Acute Tox. 4, H332 Skin Irrit. 2, H315 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Chronic 3, H412	Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method

References : Not available.

Indicates information that has changed from previously issued version.

Section 16. Any other relevant information

[Notice to reader](#)

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