

# SAFETY DATA SHEET



Lambda CE6 Induction Kit, Part Number 235200

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier

**Product name** : Lambda CE6 Induction Kit, Part Number 235200  
**Part No. (Kit)** : 235200  
**Part No.** : Lambda CE6 235200-41  
Bacteriophage  
LE392 host cells 200266-81  
BL21 competent cells 200133-41  
pUC 18 DNA Control 200231-42  
Plasmid  
Beta Mercaptoethanol 210200-43

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

#### Identified uses

Analytical reagent.	
Lambda CE6 Bacteriophage	1 ml ( $\geq 5.0 \times 10^9$ pfu/ml)
LE392 host cells	0.5 ml
BL21 competent cells	1 ml (5 x 0.2 ml)
pUC 18 DNA Control Plasmid	0.01 ml (0.1 ng/ $\mu$ l)
Beta Mercaptoethanol	0.025 ml (25 $\mu$ l 1.42M)

### 1.3 Details of the supplier of the safety data sheet

Agilent Technologies Manufacturing GmbH & Co. KG  
Hewlett-Packard-Str. 8  
76337 Waldbronn  
Germany  
0800 603 1000

**e-mail address of person responsible for this SDS** : pdl-msds\_author@agilent.com

### 1.4 Emergency telephone number

**Emergency telephone number (with hours of operation)** : CHEMTREC®: +(44)-870-8200418

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**Product definition** : Lambda CE6 Mixture  
Bacteriophage  
LE392 host cells Mixture  
BL21 competent cells Mixture  
pUC 18 DNA Control Mixture  
Plasmid  
Beta Mercaptoethanol Mixture

[Classification according to Regulation \(EC\) No. 1272/2008 \[CLP/GHS\]](#)

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## SECTION 2: Hazards identification

### Lambda CE6 Bacteriophage

H351 CARCINOGENICITY - Category 2  
 H361d REPRODUCTIVE TOXICITY (Unborn child) - Category 2  
 H373 SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE - Category 2

### Beta Mercaptoethanol

H312 ACUTE TOXICITY (dermal) - Category 4  
 H332 ACUTE TOXICITY (inhalation) - Category 4  
 H315 SKIN CORROSION/IRRITATION - Category 2  
 H318 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1  
 H317 SKIN SENSITISATION - Category 1  
 H412 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 3

**Ingredients of unknown toxicity** : LE392 host cells Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 10 - 30%  
 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%

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

## 2.2 Label elements

### Hazard pictograms

: Lambda CE6 Bacteriophage



Beta Mercaptoethanol



### Signal word

: Lambda CE6 Bacteriophage Warning  
 LE392 host cells No signal word.  
 BL21 competent cells No signal word.  
 pUC 18 DNA Control No signal word.  
 Plasmid  
 Beta Mercaptoethanol Danger

### Hazard statements

: Lambda CE6 H361d - Suspected of damaging the unborn child.  
 Bacteriophage  
 H351 - Suspected of causing cancer.  
 H373 - May cause damage to organs through prolonged or repeated exposure.  
 LE392 host cells No known significant effects or critical hazards.  
 BL21 competent cells No known significant effects or critical hazards.  
 pUC 18 DNA Control No known significant effects or critical hazards.  
 Plasmid  
 Beta Mercaptoethanol 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.  
 H412 - Harmful to aquatic life with long lasting effects.

### Precautionary statements

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## SECTION 2: Hazards identification

<b>Prevention</b>	: Lambda CE6 Bacteriophage	P201 - Obtain special instructions before use.
	LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	P280 - Wear protective gloves. Wear protective clothing. Wear eye or face protection. P260 - Do not breathe vapour. Not applicable. Not applicable. Not applicable. P280 - Wear protective gloves. Wear protective clothing. Wear eye or face protection. P273 - Avoid release to the environment.
<b>Response</b>	: Lambda CE6 Bacteriophage	P314 - Get medical attention if you feel unwell.
	LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	P308 + P313 - IF exposed or concerned: Get medical attention. Not applicable. Not applicable. Not applicable. P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P310 - IF IN EYES: Immediately call a POISON CENTER or physician.
<b>Storage</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	P405 - Store locked up.  Not applicable. Not applicable. Not applicable. Not applicable.
<b>Disposal</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations. Not applicable. Not applicable. Not applicable. P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Hazardous ingredients</b>	: Lambda CE6 Bacteriophage LE392 host cells Beta Mercaptoethanol	- trichloromethane  Not applicable. - 2-Mercaptoethanol
<b>Supplemental label elements</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable.  Safety data sheet available on request. Not applicable. Not applicable. Not applicable.
<b>Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	For use in industrial installations only.  Not applicable. Not applicable. Not applicable. Not applicable.
<b><u>Special packaging requirements</u></b>		

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## SECTION 2: Hazards identification

<b>Tactile warning of danger</b>	: Lambda CE6	Not applicable.
	Bacteriophage	
	LE392 host cells	Not applicable.
	BL21 competent cells	Not applicable.
	pUC 18 DNA Control	Not applicable.
	Plasmid	
	Beta Mercaptoethanol	Not applicable.

### 2.3 Other hazards

<b>Other hazards which do not result in classification</b>	: Lambda CE6	None known.
	Bacteriophage	
	LE392 host cells	None known.
	BL21 competent cells	None known.
	pUC 18 DNA Control	None known.
	Plasmid	
	Beta Mercaptoethanol	None known.

## SECTION 3: Composition/information on ingredients

<b>3.1 Substances</b>	: Lambda CE6 Bacteriophage	Mixture
	LE392 host cells	Mixture
	BL21 competent cells	Mixture
	pUC 18 DNA Control Plasmid	Mixture
	Beta Mercaptoethanol	Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	EC: 200-663-8 CAS: 67-66-3 Index: 602-006-00-4	≤5	Acute Tox. 4, H302 Acute Tox. 3, H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Carc. 2, H351 Repr. 2, H361d (Unborn child) STOT RE 1, H372	[1] [2]
<b>LE392 host cells</b> Glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥10 - ≤25	Not classified.	[2]
Sodium chloride	EC: 231-598-3 CAS: 7647-14-5	≤3	Eye Irrit. 2, H319	[1]
<b>BL21 competent cells</b> Glycerol	REACH #: Annex V EC: 200-289-5 CAS: 56-81-5	≥10 - ≤25	Not classified.	[2]
Sucrose	REACH #: Annex IV EC: 200-334-9 CAS: 57-50-1	≤10	Not classified.	[2]
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	EC: 200-464-6 CAS: 60-24-2	≤12	Acute Tox. 3, H301 Acute Tox. 2, H310 Acute Tox. 2, H330 Skin Irrit. 2, H315 Eye Dam. 1, H318 Skin Sens. 1, H317 STOT SE 3, H335 Aquatic Chronic 2, H411	[1]

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### SECTION 3: Composition/information on ingredients

			See Section 16 for the full text of the H statements declared above.	
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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.

#### Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
- [5] Substance of equivalent concern
- [6] Additional disclosure due to company policy

### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

<b>Eye contact</b>	: Lambda CE6 Bacteriophage	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
	LE392 host 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.
	BL21 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.
<b>Inhalation</b>	: Lambda CE6 Bacteriophage	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 unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	LE392 host cells	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	BL21 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

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		<p>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.</p>
<b>Skin contact</b>	<p>: Lambda CE6 Bacteriophage</p> <p>LE392 host cells</p> <p>BL21 competent cells</p> <p>pUC 18 DNA Control Plasmid</p> <p>Beta Mercaptoethanol</p>	<p>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.</p> <p>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.</p> <p>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.</p> <p>Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.</p> <p>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.</p>
<b>Ingestion</b>	<p>: Lambda CE6 Bacteriophage</p> <p>LE392 host cells</p> <p>BL21 competent cells</p> <p>pUC 18 DNA Control Plasmid</p>	<p>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. 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> <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> <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> <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</p>

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Beta Mercaptoethanol	personnel. Get medical attention if symptoms occur. 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.
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<b>Protection of first-aiders</b> :	Lambda CE6 Bacteriophage  LE392 host cells  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. 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.
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### 4.2 Most important symptoms and effects, both acute and delayed

#### Potential acute health effects

<b>Eye contact</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards. Causes serious eye damage.
<b>Inhalation</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards. Harmful if inhaled.
<b>Skin contact</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards. Harmful in contact with skin. Causes skin irritation. May cause an allergic skin reaction.

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<b>Ingestion</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards.  No known significant effects or critical hazards.
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### Over-exposure signs/symptoms

<b>Eye contact</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific data.  No specific data. No specific data. No specific data.  Adverse symptoms may include the following: pain watering redness
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<b>Inhalation</b>	: Lambda CE6 Bacteriophage   LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Adverse symptoms may include the following:   reduced foetal weight increase in foetal deaths skeletal malformations No specific data. No specific data. No specific data.  No specific data.
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<b>Skin contact</b>	: Lambda CE6 Bacteriophage   LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Adverse symptoms may include the following:  reduced foetal weight increase in foetal deaths skeletal malformations No specific data. No specific data. No specific data.  Adverse symptoms may include the following: pain or irritation redness blistering may occur
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<b>Ingestion</b>	: Lambda CE6 Bacteriophage   LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Adverse symptoms may include the following:  reduced foetal weight increase in foetal deaths skeletal malformations No specific data. No specific data. No specific data.  Adverse symptoms may include the following: stomach pains
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### 4.3 Indication of any immediate medical attention and special treatment needed



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## SECTION 4: First aid measures

<b>Notes to physician</b>	: Lambda CE6 Bacteriophage  LE392 host cells  BL21 competent cells  pUC 18 DNA Control Plasmid Beta Mercaptoethanol	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. 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. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
<b>Specific treatments</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	No specific treatment.  No specific treatment. No specific treatment. No specific treatment. No specific treatment.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. Use an extinguishing agent suitable for the surrounding fire.
<b>Unsuitable extinguishing media</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	None known.  None known. None known. None known. None known.

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

<b>Hazards from the substance or mixture</b>	: Lambda CE6 Bacteriophage LE392 host cells  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. 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. 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.
<b>Hazardous combustion products</b>	: Lambda CE6 Bacteriophage    LE392 host cells	Decomposition products may include the following materials:  carbon dioxide carbon monoxide sulfur oxides halogenated compounds carbonyl halides Decomposition products may include the following materials: carbon dioxide

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	carbon monoxide halogenated compounds metal oxide/oxides
BL21 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

### 5.3 Advice for firefighters

#### Special precautions for fire-fighters

: Lambda CE6 Bacteriophage	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.
LE392 host 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.
BL21 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

: Lambda CE6 Bacteriophage	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
LE392 host cells	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
BL21 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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a

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basic level of protection for chemical incidents.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

<b>For non-emergency personnel</b>	: Lambda CE6 Bacteriophage	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. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	LE392 host 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.
	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 spilt material. Put on appropriate personal protective equipment.
	pUC 18 DNA Control Plasmid	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Put on appropriate personal protective equipment.
	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 spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
<b>For emergency responders</b>	: Lambda CE6 Bacteriophage	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".
	LE392 host 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".
	BL21 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".

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## SECTION 6: Accidental release measures

<b>6.2 Environmental precautions</b>	: Lambda CE6 Bacteriophage	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).
	LE392 host 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).
	BL21 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.

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

<b>Methods for cleaning up</b>	: Lambda CE6 Bacteriophage	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.
	LE392 host 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.
	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.

<b>6.4 Reference to other sections</b>	: See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.
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## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

<b>Protective measures</b>	: Lambda CE6 Bacteriophage	Put on appropriate personal protective equipment (see Section 8). 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 vapour or mist. Do not ingest. 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.
	LE392 host cells	Put on appropriate personal protective equipment (see Section 8).
	BL21 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.
<b>Advice on general occupational hygiene</b>	: Lambda CE6 Bacteriophage	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.
	LE392 host 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.
	BL21 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

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## SECTION 7: Handling and storage

Section 8 for additional information on hygiene measures.

### 7.2 Conditions for safe storage, including any incompatibilities

Storage		
	: Lambda CE6 Bacteriophage	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.
	LE392 host 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.
	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 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 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

### 7.3 Specific end use(s)

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## SECTION 7: Handling and storage

<b>Recommendations</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Industrial applications, Professional applications. Industrial applications, Professional applications. Industrial applications, Professional applications. Industrial applications, Professional applications. Industrial applications, Professional applications.
<b>Industrial sector specific solutions</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Product/ingredient name	Exposure limit values
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	<b>EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.</b> TWA: 2 ppm 8 hours. TWA: 9.9 mg/m <sup>3</sup> 8 hours.
<b>LE392 host cells</b> Glycerol	<b>EH40/2005 WELs (United Kingdom (UK), 12/2011).</b> TWA: 10 mg/m <sup>3</sup> 8 hours. Form: Mist
<b>BL21 competent cells</b> Glycerol	<b>EH40/2005 WELs (United Kingdom (UK), 12/2011).</b> TWA: 10 mg/m <sup>3</sup> 8 hours. Form: Mist
Sucrose	<b>EH40/2005 WELs (United Kingdom (UK), 12/2011).</b> STEL: 20 mg/m <sup>3</sup> 15 minutes. TWA: 10 mg/m <sup>3</sup> 8 hours.

**Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

#### DNELs/DMELs

No DNELs/DMELs available.

#### PNECs

No PNECs available

### 8.2 Exposure controls

**Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

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## SECTION 8: Exposure controls/personal protection

### 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.
- 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.
- 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.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Liquid. Liquid. Liquid. Liquid. Liquid. Liquid.
<b>Colour</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available. Not available. Not available. Not available.
<b>Odour</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available. Not available. Not available. Not available. Not available. Not available.



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## SECTION 9: Physical and chemical properties

<b>Odour threshold</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. Not available.  Not available.
<b>pH</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	7.5  7 6.4 7.5  Not available.
<b>Melting point/freezing point</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. 0°C  Not available.
<b>Initial boiling point and boiling range</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. 100°C  Not available.
<b>Flash point</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. Not available.  Not available.
<b>Evaporation rate</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. Not available.  Not available.
<b>Flammability (solid, gas)</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not applicable.  Not applicable. Not applicable. Not applicable.  Not applicable.
<b>Upper/lower flammability or explosive limits</b>	:	Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Not available.  Not available. Not available. Not available.  Not available.

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## SECTION 9: Physical and chemical properties

<b>Vapour pressure</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Vapour density</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Relative density</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Solubility(ies)</b>	: Lambda CE6	Easily soluble in the following materials: cold water and hot water.
	Bacteriophage	
	LE392 host cells	Easily soluble in the following materials: cold water and hot water.
	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>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Auto-ignition temperature</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Decomposition temperature</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.
<b>Viscosity</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	Beta Mercaptoethanol	Not available.

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## SECTION 9: Physical and chemical properties

<b>Explosive properties</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control	Not available.
	Plasmid	
	Beta Mercaptoethanol	Not available.
<b>Oxidising properties</b>	: Lambda CE6	Not available.
	Bacteriophage	
	LE392 host cells	Not available.
	BL21 competent cells	Not available.
	pUC 18 DNA Control	Not available.
	Plasmid	
	Beta Mercaptoethanol	Not available.

### 9.2 Other information

No additional information.

## SECTION 10: Stability and reactivity

<b>10.1 Reactivity</b>	: Lambda CE6	No specific test data related to reactivity available for this product or its ingredients.
	Bacteriophage	
	LE392 host cells	No specific test data related to reactivity available for this product or its ingredients.
	BL21 competent cells	No specific test data related to reactivity available for this product or its ingredients.
	pUC 18 DNA Control	No specific test data related to reactivity available for this product or its ingredients.
	Plasmid	
	Beta Mercaptoethanol	No specific test data related to reactivity available for this product or its ingredients.
<b>10.2 Chemical stability</b>	: Lambda CE6	The product is stable.
	Bacteriophage	
	LE392 host cells	The product is stable.
	BL21 competent cells	The product is stable.
	pUC 18 DNA Control	The product is stable.
	Plasmid	
	Beta Mercaptoethanol	The product is stable.
<b>10.3 Possibility of hazardous reactions</b>	: Lambda CE6	Under normal conditions of storage and use, hazardous reactions will not occur.
	Bacteriophage	
	LE392 host cells	Under normal conditions of storage and use, hazardous reactions will not occur.
	BL21 competent cells	Under normal conditions of storage and use, hazardous reactions will not occur.
	pUC 18 DNA Control	Under normal conditions of storage and use, hazardous reactions will not occur.
	Plasmid	
	Beta Mercaptoethanol	Under normal conditions of storage and use, hazardous reactions will not occur.
<b>10.4 Conditions to avoid</b>	: Lambda CE6	No specific data.
	Bacteriophage	
	LE392 host cells	No specific data.
	BL21 competent cells	No specific data.
	pUC 18 DNA Control	No specific data.
	Plasmid	
	Beta Mercaptoethanol	No specific data.

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## SECTION 10: Stability and reactivity

<b>10.5 Incompatible materials</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	May react or be incompatible with oxidising materials.  May react or be incompatible with oxidising materials. May react or be incompatible with oxidising materials. May react or be incompatible with oxidising materials.  May react or be incompatible with oxidising materials.
<b>10.6 Hazardous decomposition products</b>	: Lambda CE6 Bacteriophage LE392 host cells  BL21 competent cells  pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	LC50 Inhalation Vapour	Rat	47702 mg/m <sup>3</sup>	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
<b>LE392 host cells</b> Sodium chloride	LD50 Oral	Rat	3000 mg/kg	-
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	LD50 Oral	Rat	244 mg/kg	-

#### Acute toxicity estimates

Route	ATE value
<b>Lambda CE6 Bacteriophage</b> Oral Inhalation (vapours)	16666.7 mg/kg 100 mg/l
<b>BL21 competent cells</b> Oral	33062.5 mg/kg
<b>Beta Mercaptoethanol</b> Oral Dermal Inhalation (vapours)	2440 mg/kg 2000 mg/kg 20 mg/l

#### Irritation/Corrosion

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## SECTION 11: Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
<b>LE392 host cells</b> Sodium chloride	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	10 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	Eyes - Severe irritant	Rabbit	-	2 milligrams	-

### Sensitiser

**Conclusion/Summary** : Not available.

### Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	Category 3	Not applicable.	Respiratory tract irritation

### Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	Category 1	Not determined	Not determined

### Aspiration hazard

Not available.

### Information on likely routes of exposure

: Lambda CE6 Bacteriophage Routes of entry anticipated: Oral, Dermal, Inhalation.  
 LE392 host cells Routes of entry anticipated: Oral, Dermal, Inhalation.  
 BL21 competent cells Routes of entry anticipated: Oral, Dermal, Inhalation.  
 pUC 18 DNA Control Not available.  
 Plasmid  
 Beta Mercaptoethanol Routes of entry anticipated: Oral, Dermal, Inhalation.

### Potential acute health effects

**Inhalation** : Lambda CE6 No known significant effects or critical hazards.  
 Bacteriophage  
 LE392 host cells No known significant effects or critical hazards.  
 BL21 competent cells No known significant effects or critical hazards.  
 pUC 18 DNA Control No known significant effects or critical hazards.  
 Plasmid  
 Beta Mercaptoethanol Harmful if inhaled.

**Ingestion** : Lambda CE6 No known significant effects or critical hazards.  
 Bacteriophage  
 LE392 host cells No known significant effects or critical hazards.  
 BL21 competent cells No known significant effects or critical hazards.  
 pUC 18 DNA Control No known significant effects or critical hazards.  
 Plasmid  
 Beta Mercaptoethanol No known significant effects or critical hazards.

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## SECTION 11: Toxicological information

<b>Skin contact</b>	:	Lambda CE6	No known significant effects or critical hazards.
		Bacteriophage	
		LE392 host cells	No known significant effects or critical hazards.
		BL21 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.
<b>Eye contact</b>	:	Lambda CE6	No known significant effects or critical hazards.
		Bacteriophage	
		LE392 host cells	No known significant effects or critical hazards.
		BL21 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.

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

<b>Inhalation</b>	:	Lambda CE6	Adverse symptoms may include the following:  reduced foetal weight increase in foetal deaths skeletal malformations
		Bacteriophage	
		LE392 host cells	
		BL21 competent cells	
		pUC 18 DNA Control Plasmid	
		Beta Mercaptoethanol	No specific data.
<b>Ingestion</b>	:	Lambda CE6	Adverse symptoms may include the following:  reduced foetal weight increase in foetal deaths skeletal malformations
		Bacteriophage	
		LE392 host cells	
		BL21 competent cells	
		pUC 18 DNA Control Plasmid	
		Beta Mercaptoethanol	Adverse symptoms may include the following: stomach pains
<b>Skin contact</b>	:	Lambda CE6	Adverse symptoms may include the following:  reduced foetal weight increase in foetal deaths skeletal malformations
		Bacteriophage	
		LE392 host cells	
		BL21 competent cells	
		pUC 18 DNA Control Plasmid	
		Beta Mercaptoethanol	Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Eye contact</b>	:	Lambda CE6	No specific data.
		Bacteriophage	
		LE392 host cells	
		BL21 competent cells	
		pUC 18 DNA Control Plasmid	
		Beta Mercaptoethanol	Adverse symptoms may include the following: pain watering redness

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## SECTION 11: Toxicological information

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

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

### Potential chronic health effects

<b>General</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	May cause damage to organs through prolonged or repeated exposure. No known significant effects or critical hazards. 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>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Mutagenicity</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Teratogenicity</b>	: Lambda CE6 Bacteriophage LE392 host cells BL21 competent cells pUC 18 DNA Control Plasmid Beta Mercaptoethanol	Suspected of damaging the unborn child. No known significant effects or critical hazards. 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>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards.
<b>Fertility effects</b>	: Lambda CE6 Bacteriophage LE392 host cells 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. No known significant effects or critical hazards.

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## SECTION 12: Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 2.803 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute LC50 29000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 13.3 ppm Fresh water	Fish - Lepomis macrochirus	96 hours
	Chronic EC10 3.61 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Chronic NOEC 1.8 mg/l Fresh water	Daphnia - Daphnia magna	21 days
<b>LE392 host cells</b> Sodium chloride	Acute EC50 4.74 g/L Fresh water	Algae - Chlamydomonas reinhardtii	96 hours
	Acute EC50 519.6 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute EC50 402600 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute IC50 6.87 g/L Fresh water	Aquatic plants - Lemna minor	96 hours
	Acute LC50 1000000 µg/l Fresh water	Fish - Morone saxatilis - Larvae	96 hours
	Chronic LC10 781 mg/l Fresh water	Crustaceans - Hyalella azteca - Juvenile (Fledgling, Hatchling, Weanling)	3 weeks
	Chronic NOEC 6 g/L Fresh water	Aquatic plants - Lemna minor	96 hours
Chronic NOEC 0.314 g/L Fresh water	Daphnia - Daphnia pulex	21 days	
Chronic NOEC 100 mg/l Fresh water	Fish - Gambusia holbrooki - Adult	8 weeks	

### 12.2 Persistence and degradability

Not available.

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>Lambda CE6 Bacteriophage</b> Trichloromethane	1.97	690	high
<b>Beta Mercaptoethanol</b> 2-Mercaptoethanol	-0.056	-	low

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**Mobility** : Not available.

### 12.5 Results of PBT and vPvB assessment

**PBT** : Not applicable.

**vPvB** : Not applicable.

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

**Date of issue/Date of revision** : 31/12/2017

24/28



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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

#### Product

**Methods of disposal** : 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.

**Hazardous waste** : The classification of the product may meet the criteria for a hazardous waste.

#### Packaging

**Methods of disposal** : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : 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

**ADR/RID / IMDG / IATA** : Not regulated.

**14.6 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.

**14.7 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

#### EU Regulation (EC) No. 1907/2006 (REACH)

##### Annex XIV - List of substances subject to authorisation

###### Annex XIV

None of the components are listed.

###### Substances of very high concern

None of the components are listed.

<b>Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles</b>	<b>Lambda CE6 Bacteriophage</b>	For use in industrial installations only.
	LE392 host cells	Not applicable.
	BL21 competent cells	Not applicable.
	pUC 18 DNA Control Plasmid	Not applicable.
	Beta Mercaptoethanol	Not applicable.

#### Other EU regulations

**Industrial emissions (integrated pollution prevention and control) - Air** : Listed

#### Ozone depleting substances (1005/2009/EU)

Not listed.

#### Prior Informed Consent (PIC) (649/2012/EU)

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## SECTION 15: Regulatory information

Ingredient name	Annex	Status
Lambda CE6 Bacteriophage Chloroform	Annex I - Part 1	Listed

### Seveso Directive

This product is not controlled under the Seveso Directive.

### 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

<b>Australia</b>	: All components are listed or exempted.
<b>Canada</b>	: All components are listed or exempted.
<b>China</b>	: Not determined.
<b>Europe</b>	: All components are listed or exempted.
<b>Japan</b>	: <b>Japan inventory (ENCS)</b> : Not determined. <b>Japan inventory (ISHL)</b> : Not determined.
<b>Malaysia</b>	: Not determined.
<b>New Zealand</b>	: Not determined.
<b>Philippines</b>	: Not determined.
<b>Republic of Korea</b>	: All components are listed or exempted.
<b>Taiwan</b>	: All components are listed or exempted.
<b>Thailand</b>	: Not determined.
<b>Turkey</b>	: Not determined.
<b>United States</b>	: All components are listed or exempted.
<b>Viet Nam</b>	: Not determined.

**15.2 Chemical safety assessment** : This product contains substances for which Chemical Safety Assessments might still be required.

## SECTION 16: Other information

📄 Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate  
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]  
DNEL = Derived No Effect Level  
EUH statement = CLP-specific Hazard statement  
PNEC = Predicted No Effect Concentration  
RRN = REACH Registration Number

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

**Date of issue/Date of revision** : 31/12/2017

26/28

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**SECTION 16: Other information**

Classification	Justification
<p><b>Lambda CE6 Bacteriophage</b>                      Carc. 2, H351                      Repr. 2, H361d (Unborn child)                      STOT RE 2, H373</p> <p><b>Beta Mercaptoethanol</b>                      Acute Tox. 4, H312                      Acute Tox. 4, H332                      Skin Irrit. 2, H315                      Eye Dam. 1, H318                      Skin Sens. 1, H317                      Aquatic Chronic 3, H412</p>	<p>Calculation method                      Calculation method                      Calculation method</p> <p>Calculation method                      Calculation method                      Calculation method                      Calculation method                      Calculation method                      Calculation method</p>

Full text of abbreviated H statements

<p><b>Lambda CE6 Bacteriophage</b>                      H302                      H315                      H319                      H331                      H351                      H361d                      H372                      H373</p> <p><b>LE392 host cells</b>                      H319</p> <p><b>Beta Mercaptoethanol</b>                      H301                      H310                      H312                      H315                      H317                      H318                      H330                      H332                      H335                      H411                      H412</p>	<p>Harmful if swallowed.                      Causes skin irritation.                      Causes serious eye irritation.                      Toxic if inhaled.                      Suspected of causing cancer.                      Suspected of damaging the unborn child.                      Causes damage to organs through prolonged or repeated exposure.                      May cause damage to organs through prolonged or repeated exposure.</p> <p>Causes serious eye irritation.</p> <p>Toxic if swallowed.                      Fatal in contact with skin.                      Harmful in contact with skin.                      Causes skin irritation.                      May cause an allergic skin reaction.                      Causes serious eye damage.                      Fatal if inhaled.                      Harmful if inhaled.                      May cause respiratory irritation.                      Toxic to aquatic life with long lasting effects.                      Harmful to aquatic life with long lasting effects.</p>
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Full text of classifications [CLP/GHS]

<p><b>Lambda CE6 Bacteriophage</b>                      Acute Tox. 3, H331                      Acute Tox. 4, H302                      Carc. 2, H351                      Eye Irrit. 2, H319                      Repr. 2, H361d                      Skin Irrit. 2, H315                      STOT RE 1, H372</p> <p>STOT RE 2, H373</p> <p><b>LE392 host cells</b>                      Eye Irrit. 2, H319</p> <p><b>Beta Mercaptoethanol</b>                      Acute Tox. 2, H310                      Acute Tox. 2, H330</p>	<p>ACUTE TOXICITY (inhalation) - Category 3                      ACUTE TOXICITY (oral) - Category 4                      CARCINOGENICITY - Category 2                      SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2                      REPRODUCTIVE TOXICITY (Unborn child) - Category 2                      SKIN CORROSION/IRRITATION - Category 2                      SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE                      - Category 1                      SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE                      - Category 2</p> <p>SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2</p> <p>ACUTE TOXICITY (dermal) - Category 2                      ACUTE TOXICITY (inhalation) - Category 2</p>
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## SECTION 16: Other information

Acute Tox. 3, H301 Acute Tox. 4, H312 Acute Tox. 4, H332 Aquatic Chronic 2, H411 Aquatic Chronic 3, H412 Eye Dam. 1, H318 Skin Irrit. 2, H315 Skin Sens. 1, H317 STOT SE 3, H335	ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 3 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1 SKIN CORROSION/IRRITATION - Category 2 SKIN SENSITISATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract irritation) - Category 3
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**Date of issue/ Date of revision** : 31/12/2017

**Date of previous issue** : No previous validation.

**Version** : 1

### Notice to reader

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