Section 1. Identification

1.1 Product identifier
Product name: pBC KS (+) Phagemid, Part Number 212217
Part no. (chemical kit): 212217
Part no.: pBC KS+ Phagemid 212217-51
XL1-Blue MRF’ E.coli Strain 200301-81
Validation date: 8/31/2018

1.2 Relevant identified uses of the substance or mixture and uses advised against
Material uses:
- pBC KS+ Phagemid 0.02 ml (20 µg 1 µg/µl)
- XL1-Blue MRF’ E.coli Strain 0.5 ml

1.3 Details of the supplier of the safety data sheet
Supplier/Manufacturer: Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

1.4 Emergency telephone number
In case of emergency: CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture
OSHA/HCS status: pBC KS+ Phagemid
While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

XL1-Blue MRF’ E.coli Strain
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture
XL1-Blue MRF’ E.coli Strain
H319 - EYE IRRITATION - Category 2A

Ingredients of unknown toxicity: XL1-Blue MRF’ E.coli Strain
Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 10 - 30%

2.2 GHS label elements
Hazard pictograms: XL1-Blue MRF’ E.coli Strain

Signal word: No signal word.
Warning

Hazard statements:
- pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
No known significant effects or critical hazards.
H319 - Causes serious eye irritation.

Date of issue: 08/31/2018
Section 2. Hazards identification

Precautionary statements

Prevention: pBC KS+ Phagemid Not applicable.
XL1-Blue MRF' E.coli Strain P280 - Wear eye or face protection.
P264 - Wash hands thoroughly after handling.

Response: pBC KS+ Phagemid Not applicable.
XL1-Blue MRF' E.coli Strain P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

Storage: pBC KS+ Phagemid Not applicable.
XL1-Blue MRF' E.coli Strain Not applicable.

Disposal: pBC KS+ Phagemid Not applicable.
XL1-Blue MRF' E.coli Strain Not applicable.

Supplemental label elements: pBC KS+ Phagemid None known.
XL1-Blue MRF' E.coli Strain None known.

2.3 Other hazards

Hazards not otherwise classified: pBC KS+ Phagemid None known.
XL1-Blue MRF' E.coli Strain None known.

Section 3. Composition/information on ingredients

Substance/mixture: pBC KS+ Phagemid Mixture
XL1-Blue MRF' E.coli Strain Mixture

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain</td>
<td>≥10 - ≤25</td>
<td>56-81-5</td>
</tr>
<tr>
<td>Glycerol</td>
<td>≤3</td>
<td>7647-14-5</td>
</tr>
</tbody>
</table>

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

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

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

Section 4. First aid measures

4.1 Description of necessary first aid measures

Eye contact: pBC KS+ Phagemid
XL1-Blue MRF' E.coli Strain

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.

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.

Date of issue: 08/31/2018
### Section 4. First aid measures

#### Inhalation

- **pBC KS+ Phagemid**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
- **XL1-Blue MRF’ E.coli Strain**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

#### Skin contact

- **pBC KS+ Phagemid**: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- **XL1-Blue MRF’ E.coli Strain**: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

#### Ingestion

- **pBC KS+ Phagemid**: 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.
- **XL1-Blue MRF’ E.coli Strain**: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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

##### Potential acute health effects

- **Eye contact**: No known significant effects or critical hazards. Causes serious eye irritation.
- **Inhalation**: No known significant effects or critical hazards. No known significant effects or critical hazards.
- **Skin contact**: No known significant effects or critical hazards. No known significant effects or critical hazards.
Section 4. First aid measures

### Ingestion
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - No known significant effects or critical hazards.

### Over-exposure signs/symptoms
- **Eye contact**
  - **pBC KS+ Phagemid**
  - **XL1-Blue MRF’ E.coli Strain**
    - No specific data.
  - **XL1-Blue MRF’ E.coli Strain**
    - Adverse symptoms may include the following:
      - pain or irritation
      - watering
      - redness

### Inhalation
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - No specific data.

### Skin contact
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - No specific data.

### Protection of first-aiders
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - 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.

### Specific treatments
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - No specific treatment.

### Notes to physician
- **pBC KS+ Phagemid**
- **XL1-Blue MRF’ E.coli Strain**
  - Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 5. Fire-fighting measures

### 5.1 Extinguishing media
- **Suitable extinguishing media**
  - **pBC KS+ Phagemid**
  - **XL1-Blue MRF’ E.coli Strain**
    - Use an extinguishing agent suitable for the surrounding fire.

- **Unsuitable extinguishing media**
  - **pBC KS+ Phagemid**
  - **XL1-Blue MRF’ E.coli Strain**
    - None known.

### 5.2 Special hazards arising from the substance or mixture
- **Specific hazards arising from the chemical**
  - **pBC KS+ Phagemid**
  - **XL1-Blue MRF’ E.coli Strain**
    - In a fire or if heated, a pressure increase will occur and the container may burst.

See toxicological information (Section 11)
## Section 5. Fire-fighting measures

| Hazardous thermal decomposition products | pBC KS+ Phagemid | No specific data. | XL1-Blue MRF’ E.coli Strain | Decomposition products may include the following materials: carbon dioxide, carbon monoxide, halogenated compounds, metal oxide/oxides |

### 5.3 Advice for firefighters

#### Special protective actions for fire-fighters

| pBC KS+ Phagemid | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. |
| XL1-Blue MRF’ E.coli Strain | 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. |

| pBC KS+ Phagemid | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
| XL1-Blue MRF’ E.coli Strain | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |

## Section 6. Accidental release measures

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

#### For non-emergency personnel

| pBC KS+ Phagemid | No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. |
| XL1-Blue MRF’ E.coli Strain | No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. |

#### For emergency responders

| pBC KS+ Phagemid | If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". |
| XL1-Blue MRF’ E.coli Strain | If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". |
Section 6. Accidental release measures

6.2 Environmental precautions

<table>
<thead>
<tr>
<th>Material</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>pBC KS+ Phagemid</td>
<td>Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).</td>
</tr>
<tr>
<td>XL1-Blue MRF’ E.coli Strain</td>
<td>Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).</td>
</tr>
</tbody>
</table>

6.3 Methods and materials for containment and cleaning up

<table>
<thead>
<tr>
<th>Method for cleaning up</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.</td>
<td>pBC KS+ Phagemid</td>
</tr>
<tr>
<td>Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.</td>
<td>XL1-Blue MRF’ E.coli Strain</td>
</tr>
</tbody>
</table>

Section 7. Handling and storage

7.1 Precautions for safe handling

<table>
<thead>
<tr>
<th>Protective measures</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put on appropriate personal protective equipment (see Section 8).</td>
<td>pBC KS+ Phagemid</td>
</tr>
<tr>
<td>Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.</td>
<td>XL1-Blue MRF’ E.coli Strain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advice on general occupational hygiene</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.</td>
<td>pBC KS+ Phagemid</td>
</tr>
<tr>
<td>Potentially biohazardous material. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.</td>
<td>XL1-Blue MRF’ E.coli Strain</td>
</tr>
</tbody>
</table>
Section 7. Handling and storage

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

**XL1-Blue MRF' E.coli Strain**
Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

**Recommendations**: pBC KS+ Phagemid
Industrial applications, Professional applications.

**Industrial sector specific solutions**: pBC KS+ Phagemid
Not applicable.

**XL1-Blue MRF' E.coli Strain**
Industrial applications, Professional applications.

**Industry sector specific solutions**: pBC KS+ Phagemid
Not applicable.

Section 8. Exposure controls/personal protection

8.1 Control parameters

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain Glycerol</td>
<td>OSHA PEL 1989 (United States, 3/1989). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 10 mg/m³ 8 hours. Form: Total dust</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 6/2016). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust None.</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>None.</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

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

**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**

**Date of issue**: 08/31/2018
Section 8. Exposure controls/personal protection

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. 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: safety glasses with side-shields.

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.

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

9.1 Information on basic physical and chemical properties

Appearance

<table>
<thead>
<tr>
<th>Property</th>
<th>pBC KS+ Phagemid</th>
<th>XL1-Blue MRF' E.coli Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid.</td>
<td>Liquid.</td>
</tr>
<tr>
<td>Color</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Odor</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>pH</td>
<td>7.5</td>
<td>7</td>
</tr>
<tr>
<td>Melting point</td>
<td>0°C (32°F)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>100°C (212°F)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Lower and upper explosive (flammable) limits</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available.</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Date of issue: 08/31/2018
### Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>pBC KS+ Phagemid</th>
<th>Not available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative density</td>
<td>pBC KS+ Phagemid</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility</td>
<td>pBC KS+ Phagemid</td>
<td>Easily soluble in the following materials: cold water and hot water.</td>
</tr>
<tr>
<td></td>
<td>XL1-Blue MRF' E.coli Strain</td>
<td>Soluble in the following materials: cold water and hot water.</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>pBC KS+ Phagemid</td>
<td>Not available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>pBC KS+ Phagemid</td>
<td>Not available.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>pBC KS+ Phagemid</td>
<td>Not available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>pBC KS+ Phagemid</td>
<td>Not available.</td>
</tr>
<tr>
<td></td>
<td>XL1-Blue MRF' E.coli Strain</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

### Section 10. Stability and reactivity

10.1 Reactivity : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - The product is stable.

10.3 Possibility of hazardous reactions : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - No specific data.

10.5 Incompatible materials : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - May react or be incompatible with oxidizing materials.

10.6 Hazardous decomposition products : pBC KS+ Phagemid
- XL1-Blue MRF’ E.coli Strain
  - 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

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>12600 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3000 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>Glycerol</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 100 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensitization
Not available.

Mutagenicity
Conclusion/Summary: Not available.

Carcinogenicity
Conclusion/Summary: Not available.

Reproductive toxicity
Conclusion/Summary: Not available.

Teratogenicity
Conclusion/Summary: Not available.

Specific target organ toxicity (single exposure)
Not available.

Specific target organ toxicity (repeated exposure)
Not available.

Aspiration hazard
Not available.

Information on the likely routes of exposure:
Not available.

Potential acute health effects

Eye contact: pBC KS+ Phagemid, XL1-Blue MRF' E.coli Strain
No known significant effects or critical hazards. Causes serious eye irritation.

Inhalation: pBC KS+ Phagemid, XL1-Blue MRF' E.coli Strain
No known significant effects or critical hazards.

Skin contact: pBC KS+ Phagemid, XL1-Blue MRF' E.coli Strain
No known significant effects or critical hazards.

Ingestion: pBC KS+ Phagemid, XL1-Blue MRF' E.coli Strain
No known significant effects or critical hazards.

Date of issue: 08/31/2018
Section 11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact:
- pBC KS+ Phagemid No specific data.
- XL1-Blue MRF' E.coli Strain Adverse symptoms may include the following:
  - pain or irritation
  - watering
  - redness

Inhalation:
- pBC KS+ Phagemid No specific data.
- XL1-Blue MRF' E.coli Strain No specific data.

Skin contact:
- pBC KS+ Phagemid No specific data.
- XL1-Blue MRF' E.coli Strain No specific data.

Ingestion:
- pBC KS+ Phagemid No specific data.
- XL1-Blue MRF' E.coli Strain No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure
- Potential immediate effects: Not available.
- Potential delayed effects: Not available.

Long term exposure
- Potential immediate effects: Not available.
- Potential delayed effects: Not available.

Potential chronic health effects

- General:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

- Carcinogenicity:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

- Mutagenicity:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

- Teratogenicity:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

- Developmental effects:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

- Fertility effects:
  - pBC KS+ Phagemid No known significant effects or critical hazards.
  - XL1-Blue MRF' E.coli Strain No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain Oral</td>
<td>300000 mg/kg</td>
</tr>
</tbody>
</table>
Section 12. Ecological information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF’ E.coli Strain</td>
<td>Acute LC50 54000 mg/l Fresh water</td>
<td>Fish - Oncorhynchus mykiss</td>
<td>96 hours</td>
</tr>
<tr>
<td>Glycerol</td>
<td>Acute EC50 4.74 g/L Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii</td>
<td>96 hours</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>Acute EC50 519.6 mg/l Fresh water</td>
<td>Crustaceans - Cypris subglobosa</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 402600 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute IC50 6.87 g/L Fresh water</td>
<td>Aquatic plants - Lemna minor</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 1000000 µg/l Fresh water</td>
<td>Fish - Morone saxatilis - Larvae</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic LC10 781 mg/l Fresh water</td>
<td>Crustaceans - Hyalella azteca - Juvenile (Fledgling, Hatchling, Weanling)</td>
<td>3 weeks</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 6 g/L Fresh water</td>
<td>Aquatic plants - Lemna minor</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 0.314 g/L Fresh water</td>
<td>Daphnia - Daphnia pulex</td>
<td>21 days</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 100 mg/l Fresh water</td>
<td>Fish - Gambusia holbrooki - Adult</td>
<td>8 weeks</td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Result</th>
<th>Dose</th>
<th>Inoculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF’ E.coli Strain</td>
<td>301D Ready Biodegradability - Closed Bottle Test</td>
<td>93 % - 30 days</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Glycerol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF’ E.coli Strain</td>
<td>-1.76</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Glycerol</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12.4 Mobility in soil

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

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

Section 13. Disposal considerations

13.1 Waste treatment methods

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

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Section 13. Disposal considerations

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

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

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

Section 14. Transport information

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

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

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

Section 15. Regulatory information

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

U.S. Federal regulations
- Clean Water Act (CWA) 311: Edetic acid
- Clean Air Act  Section 112(b) Hazardous Air Pollutants (HAPs): Not listed
- Clean Air Act Section 602 Class I Substances: Not listed
- Clean Air Act Section 602 Class II Substances: Not listed
- DEA List I Chemicals (Precursor Chemicals): Not listed
- DEA List II Chemicals (Essential Chemicals): Not listed
- TSCA 8(a) CDR Exempt/Partial exemption: Not determined
- SARA 302/304 RQ: Not applicable.
- SARA 311/312 Classification: Not applicable.
- Composition/information on ingredients: No products were found.

XL1-Blue MRF’ E.coli Strain: EYE IRRITATION - Category 2A

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Section 15. Regulatory information

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF’ E.coli Strain</td>
<td></td>
<td>EYE IRRITATION - Category 2A</td>
</tr>
<tr>
<td>Glycerol</td>
<td>≥10 - ≤25</td>
<td>EYE IRRITATION - Category 2A</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>≤3</td>
<td>EYE IRRITATION - Category 2A</td>
</tr>
</tbody>
</table>

State regulations
Massachusetts: The following components are listed: GLYCERINE MIST
New York: None of the components are listed.
New Jersey: The following components are listed: GLYCERIN; 1,2,3-PROPANETRIOL
Pennsylvania: The following components are listed: 1,2,3-PROPANETRIOL

International regulations
Chemical Weapon Convention List Schedules I, II & III Chemicals
Not listed.

Montreal Protocol (Annexes A, B, C, E)
Not listed.

Stockholm Convention on Persistent Organic Pollutants
Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)
Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals
Not listed.

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

Date of issue: 08/31/2018
Section 16. Other information

History
Date of issue : 08/31/2018
Date of previous issue : 06/23/2017
Version : 5

Procedure used to derive the classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL1-Blue MRF' E.coli Strain</td>
<td></td>
</tr>
<tr>
<td>EYE IRRITATION - Category 2A</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

Notice to reader

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