SAFETY DATA SHEET

P3311 pH triode combination electrode, Part Number 5190-3990

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

1.1 Product identifier
Product name: P3311 pH triode combination electrode, Part Number 5190-3990
Part No. (Kit): 5190-3990
Part No.: * P3311 electrode P3311
Reference solution 5190-0545-1

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

<table>
<thead>
<tr>
<th>Identified uses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical chemistry.</td>
<td></td>
</tr>
<tr>
<td>* P3311 electrode</td>
<td>Electrodes. (1 x 7 ml)</td>
</tr>
<tr>
<td>Reference solution</td>
<td>1 x 30 ml</td>
</tr>
</tbody>
</table>

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

Note *: * This product is considered an article. This Safety Data Sheet is written based on the encapsulated substance or mixture in this article. This article, when used under reasonable conditions and in accordance with the directions for use, should not present a health hazard. The substance or mixture is encapsulated in the article. Only if released due to use or processing of the article in a manner not in accordance with the product’s directions for use it may present potential health and safety hazards.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

<table>
<thead>
<tr>
<th>Product definition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td>Mixture (encapsulated in article)</td>
</tr>
<tr>
<td>Reference solution</td>
<td>Mixture</td>
</tr>
</tbody>
</table>

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

* P3311 electrode
H400 ACUTE AQUATIC HAZARD - Category 1
H410 LONG-TERM AQUATIC HAZARD - Category 1

Reference solution
H400 ACUTE AQUATIC HAZARD - Category 1
H410 LONG-TERM AQUATIC HAZARD - Category 1

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

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SECTION 2: Hazards identification

Hazard pictograms:

Signal word:
* P3311 electrode: Warning
Reference solution: Warning

Hazard statements:
* P3311 electrode: GHS09 - Very toxic to aquatic life with long lasting effects.
Reference solution: GHS09 - Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention:
* P3311 electrode: P273 - Avoid release to the environment.
Reference solution: P273 - Avoid release to the environment.

Response:
* P3311 electrode: P391 - Collect spillage.
Reference solution: P391 - Collect spillage.

Storage:
* P3311 electrode: Not applicable.
Reference solution: Not applicable.

Disposal:
* P3311 electrode: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Reference solution: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazardous ingredients:
No hazardous ingredient

Supplemental label elements:
* P3311 electrode: Not applicable.
Reference solution: Not applicable.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Not applicable.

Special packaging requirements:

Tactile warning of danger:
* P3311 electrode: Not applicable.
Reference solution: Not applicable.

2.3 Other hazards

Other hazards which do not result in classification:
* P3311 electrode: None known.
Reference solution: None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures:

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Identifiers</th>
<th>%</th>
<th>Classification</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAS: 56-81-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethandiol</td>
<td>EC: 203-473-3</td>
<td>≤5</td>
<td>Acute Tox. 4, H302</td>
<td>[1][2]</td>
</tr>
<tr>
<td></td>
<td>CAS: 107-21-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index: 603-027-00-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver chloride</td>
<td>EC: 232-033-3</td>
<td>≤3</td>
<td>Aquatic Acute 1, H400 (M=100)</td>
<td>[1][2]</td>
</tr>
<tr>
<td></td>
<td>CAS: 7783-90-6</td>
<td></td>
<td>Aquatic Chronic 1, H410 (M=100)</td>
<td></td>
</tr>
<tr>
<td>Reference solution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver chloride</td>
<td>EC: 232-033-3</td>
<td>≤1</td>
<td>Aquatic Acute 1, H400 (M=100)</td>
<td>[1][2]</td>
</tr>
<tr>
<td></td>
<td>CAS: 7783-90-6</td>
<td></td>
<td>Aquatic Chronic 1, H410 (M=100)</td>
<td></td>
</tr>
</tbody>
</table>

Date of issue/Date of revision: 26/07/2016
## SECTION 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>See Section 16 for the full text of the H statements declared above.</th>
</tr>
</thead>
</table>

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

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

#### Eye contact

**P3311 electrode**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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 if irritation occurs.</th>
</tr>
</thead>
</table>

**Reference solution**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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 if irritation occurs.</th>
</tr>
</thead>
</table>

#### Inhalation

**P3311 electrode**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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.</th>
</tr>
</thead>
</table>

**Reference solution**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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.</th>
</tr>
</thead>
</table>

#### Skin contact

**P3311 electrode**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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.</th>
</tr>
</thead>
</table>

**Reference solution**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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.</th>
</tr>
</thead>
</table>

#### Ingestion

**P3311 electrode**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>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</th>
</tr>
</thead>
</table>

Reference solution

| *P3311 electrode* | 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 |
SECTION 4: First aid measures

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.

Reference solution
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.

Protection of first-aiders
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.

Reference solution
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.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

| Eye contact | * P3311 electrode | No known significant effects or critical hazards. |
| Reference solution | * P3311 electrode | No known significant effects or critical hazards. |

| Inhalation | * P3311 electrode | No known significant effects or critical hazards. |
| Reference solution | * P3311 electrode | No known significant effects or critical hazards. |

| Skin contact | * P3311 electrode | No known significant effects or critical hazards. |
| Reference solution | * P3311 electrode | No known significant effects or critical hazards. |

| Ingestion | * P3311 electrode | No known significant effects or critical hazards. |
| Reference solution | * P3311 electrode | No known significant effects or critical hazards. |

Over-exposure signs/symptoms

| Eye contact | * P3311 electrode | No specific data. |
| Reference solution | * P3311 electrode | No specific data. |

| Inhalation | * P3311 electrode | No specific data. |
| Reference solution | * P3311 electrode | No specific data. |

| Skin contact | * P3311 electrode | No specific data. |
| Reference solution | * P3311 electrode | No specific data. |

| Ingestion | * P3311 electrode | No specific data. |
| Reference solution | * P3311 electrode | No specific data. |

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician
Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Reference solution
Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments
No specific treatment.
SECTION 5: Firefighting measures

5.1 Extinguishing media

| Suitable extinguishing media | * P3311 electrode | Use an extinguishing agent suitable for the surrounding fire. |
| Reference solution | Use an extinguishing agent suitable for the surrounding fire. |
| Unsuitable extinguishing media | * P3311 electrode | None known. |
| Reference solution | None known. |

5.2 Special hazards arising from the substance or mixture

| Hazards from the substance or mixture | * P3311 electrode | In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic 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. |
| Reference solution | In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. |
| Hazardous combustion products | * P3311 electrode | Decomposition products may include the following materials: carbon dioxide, carbon monoxide, phosphorus oxides, halogenated compounds, metal oxide/oxides |
| Reference solution | Decomposition products may include the following materials: halogenated compounds, metal oxide/oxides |

5.3 Advice for firefighters

| Special precautions for fire-fighters | * P3311 electrode | 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. |
| Reference solution | 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 | * P3311 electrode | 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. |
| Reference solution | 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. |

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

| For non-emergency personnel | * P3311 electrode | 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. |
| Reference solution | No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. |
SECTION 6: Accidental release measures

For emergency responders

* P3311 electrode

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.

Reference solution

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".

6.2 Environmental precautions

* P3311 electrode

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. Collect spillage.

Reference solution

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. Collect spillage.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up

* P3311 electrode

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.

Reference solution

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.

6.4 Reference to other sections

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.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures

* P3311 electrode

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Avoid release to the environment. 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.

Reference solution

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Avoid release to the environment. 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.
**SECTION 7: Handling and storage**

### Advice on general occupational hygiene

* P3311 electrode

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.

**Reference solution**

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

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

* P3311 electrode

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.

**Reference solution**

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.

#### Danger criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Notification and MAPP threshold</th>
<th>Safety report threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Reference solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

### 7.3 Specific end use(s)

**Recommendations**

* P3311 electrode

Industrial applications, Professional applications.

**Reference solution**

Industrial applications, Professional applications.

**Industrial sector specific solutions**

* P3311 electrode

Not applicable.

**Reference solution**

Not applicable.

**SECTION 8: Exposure controls/personal protection**

### 8.1 Control parameters

**Occupational exposure limits**
**SECTION 8: Exposure controls/personal protection**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Exposure limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P3311 electrode</strong></td>
<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>EH40/2005 WELs (United Kingdom (UK), 12/2011). TWA: 10 mg/m³ 8 hours. Form: Mist</td>
</tr>
<tr>
<td>Ethanediol</td>
<td>EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin. TWA: 10 mg/m³ 8 hours. Form: Particulate STEL: 104 mg/m³ 15 minutes. Form: Vapour TWA: 52 mg/m³ 8 hours. Form: Vapour STEL: 40 ppm 15 minutes. Form: Vapour TWA: 20 ppm 8 hours. Form: Vapour</td>
</tr>
<tr>
<td>Silver chloride</td>
<td>EH40/2005 WELs (United Kingdom (UK), 12/2011). TWA: 0.01 mg/m³, (as Ag) 8 hours.</td>
</tr>
<tr>
<td><strong>Reference solution</strong></td>
<td>EH40/2005 WELs (United Kingdom (UK), 12/2011). TWA: 0.01 mg/m³, (as Ag) 8 hours.</td>
</tr>
</tbody>
</table>

**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.

**Individual protection measures**

**Hygiene measures**: 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. 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.

**Date of issue/Date of revision**: 26/07/2016
## SECTION 8: Exposure controls/personal protection

**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**
  - **Colour**: *P3311 electrode* Not available, *Reference solution* White.
  - **Odour**: *P3311 electrode* Not available, *Reference solution* Not available.
  - **Odour threshold**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Melting point/freezing point**: *P3311 electrode* -25°C, *Reference solution* 0°C.

- **Initial boiling point and boiling range**: *P3311 electrode* 110°C, *Reference solution* 100°C.

- **Flash point**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Evaporation rate**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Flammability (solid, gas)**: *P3311 electrode* Not applicable, *Reference solution* Not applicable.

- **Upper/lower flammability or explosive limits**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Vapour pressure**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Vapour density**: *P3311 electrode* Not available, *Reference solution* Not available.


- **Solubility(ies)**: *P3311 electrode* Soluble in the following materials: cold water and hot water, *Reference solution* Easily soluble in the following materials: cold water and hot water.

- **Partition coefficient: n-octanol/water**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Auto-ignition temperature**: *P3311 electrode* Not available, *Reference solution* Not available.

- **Decomposition temperature**: *P3311 electrode* Not available, *Reference solution* Not available.
SECTION 9: Physical and chemical properties

**Viscosity**
- *P3311 electrode*: Not available.
- *Reference solution*: Not available.

**Explosive properties**
- *P3311 electrode*: Non-explosive in the presence of the following materials or conditions: oxidizing materials.
- *Reference solution*: Not available.

**Oxidising properties**
- *P3311 electrode*: Not available.
- *Reference solution*: Not available.

9.2 Other information
No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity
- *P3311 electrode*: No specific test data related to reactivity available for this product or its ingredients.
- *Reference solution*: No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability
- *P3311 electrode*: The product is stable.
- *Reference solution*: The product is stable.

10.3 Possibility of hazardous reactions
- *P3311 electrode*: Under normal conditions of storage and use, hazardous reactions will not occur.
- *Reference solution*: Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid
- *P3311 electrode*: No specific data.
- *Reference solution*: No specific data.

10.5 Incompatible materials
- *P3311 electrode*: May react or be incompatible with oxidising materials.
- *Reference solution*: May react or be incompatible with oxidising materials.

10.6 Hazardous decomposition products
- *P3311 electrode*: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- *Reference solution*: 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><em>P3311 electrode</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethandiol</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4700 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Silver chloride</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>&gt;5000 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Reference solution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver chloride</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>&gt;5000 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

**Acute toxicity estimates**

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>16666.7 mg/kg</td>
</tr>
</tbody>
</table>

**Irritation/Corrosion**

Date of issue/Date of revision: 26/07/2016
**SECTION 11: Toxicological information**

<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><em>P3311 electrode</em></td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>Ethanediol</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>1 hour 100 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>6 hours 1440 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>555 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

**Sensitiser**

**Conclusion/Summary**: Not available.

**Chronic toxicity / Carcinogenicity / Mutagenicity / Teratogenicity / Reproductive toxicity**

Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.

**Aspiration hazard**

Not available.

**Information on likely routes of exposure**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>Routes of entry anticipated: Oral, Dermal, Inhalation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>Routes of entry anticipated: Oral, Dermal, Inhalation.</td>
</tr>
</tbody>
</table>

**Potential acute health effects**

**Inhalation**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

**Ingestion**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

**Skin contact**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

**Eye contact**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No known significant effects or critical hazards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No known significant effects or critical hazards.</td>
</tr>
</tbody>
</table>

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

**Inhalation**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No specific data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

**Ingestion**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No specific data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

**Skin contact**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No specific data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

**Eye contact**

<table>
<thead>
<tr>
<th><em>P3311 electrode</em></th>
<th>No specific data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference solution</td>
<td>No specific data.</td>
</tr>
</tbody>
</table>

**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.

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SECTION 11: Toxicological information

Potential chronic health effects

General: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

Carcinogenicity: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

Mutagenicity: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

Teratogenicity: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

Developmental effects: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

Fertility effects: * P3311 electrode No known significant effects or critical hazards.
Reference solution No known significant effects or critical hazards.

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>* P3311 electrode</td>
<td>Acute LC50 10000000 µg/l Fresh water</td>
<td>Crustaceans - Ceriodaphnia dubia - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td>Ethane diol</td>
<td>Acute LC50 41000000 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 8050000 µg/l Fresh water</td>
<td>Fish - Pimephales promelas guntea</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 5.3 µg/l Fresh water</td>
<td>Fish - Lepidocephalichthys guntea</td>
<td>96 hours</td>
</tr>
<tr>
<td>Silver chloride</td>
<td>Acute LC50 5.3 µg/l Fresh water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference solution</td>
<td>Acute LC50 5.3 µg/l Fresh water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver chloride</td>
<td>Acute LC50 5.3 µg/l Fresh water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability

Not available.

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Aquatic half-life</th>
<th>Photolysis</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td>-</td>
<td>-</td>
<td>Readily</td>
</tr>
<tr>
<td>Ethane diol</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td>-1.36</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Ethane diol</td>
<td>-</td>
<td>70</td>
<td>low</td>
</tr>
<tr>
<td>Silver chloride</td>
<td>-</td>
<td></td>
<td>low</td>
</tr>
<tr>
<td>Reference solution</td>
<td>-</td>
<td>70</td>
<td>low</td>
</tr>
<tr>
<td>Silver chloride</td>
<td>-</td>
<td></td>
<td>low</td>
</tr>
</tbody>
</table>

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.

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P3311 pH triode combination electrode, Part Number 5190-3990

SECTION 12: Ecological information

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

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

Regulatory 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.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

* P3311 electrode Reference solution

Not applicable. Not applicable.

Other EU regulations

Europe inventory : All components are listed or exempted.

Seveso Directive

This product is controlled under the Seveso Directive.

Danger criteria

Date of issue/Date of revision : 26/07/2016
SECTION 15: Regulatory information

Category

* P3311 electrode
E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1

Reference solution
E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1

National regulations

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 Inform Consent (PIC)
Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals
Not listed.

International lists

National inventory

Australia: All components are listed or exempted.
Canada: All components are listed or exempted.
China: 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: All components are listed or exempted.
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.
Turkey: Not determined.
United States: All components are listed or exempted.

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]


**SECTION 16: Other information**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>* P3311 electrode</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Acute 1, H400</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Chronic 1, H410</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

**Reference solution**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Acute 1, H400</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Aquatic Chronic 1, H410</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

**Full text of abbreviated H statements**

| * P3311 electrode | H302 | Harmful if swallowed. |
|                   | H400 | Very toxic to aquatic life. |
|                   | H410 | Very toxic to aquatic life with long lasting effects. |

**Full text of classifications [CLP/GHS]**

| * P3311 electrode | Acute Tox. 4, H302 | ACUTE TOXICITY (oral) - Category 4 |
|                   | Aquatic Acute 1, H400 | ACUTE AQUATIC HAZARD - Category 1 |
|                   | Aquatic Chronic 1, H410 | LONG-TERM AQUATIC HAZARD - Category 1 |

**Reference solution**

| Aquatic Acute 1, H400 | ACUTE AQUATIC HAZARD - Category 1 |
| Aquatic Chronic 1, H410 | LONG-TERM AQUATIC HAZARD - Category 1 |

**Date of issue/Date of revision**

: 26/07/2016

**Date of previous issue**

: No previous validation.

**Version**

: 1

**Note ***

: * This product is considered an article. This Safety Data Sheet is written based on the encapsulated substance or mixture in this article. This article, when used under reasonable conditions and in accordance with the directions for use, should not present a health hazard. The substance or mixture is encapsulated in the article. Only if released due to use or processing of the article in a manner not in accordance with the product’s directions for use it may present potential health and safety hazards.

**Notice to reader**

Disclaimer: The information contained in this document is based on Agilent’s state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.