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

- **1.1 Product identifier**
  - **Product name:** Ruthenium Standard: 10000 µg/mL Ru in 20% HCl [100ml bottle]
  - **Part number:** 5190-8442

- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
  - No further relevant information available.

- **Application of the substance / the mixture**
  - Reference material for laboratory use only

- **Manufacturer/Supplier:**
  - Agilent Technologies Australia Pty Ltd
  - 679 Springvale Road
  - Mulgrave
  - Victoria 3170, Australia

- **Further information obtainable from:**
  - e-mail: pdl-msds_author@agilent.com

- **1.4 Emergency telephone number:**
  - CHEMTREC®: +(61) - 290372994

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
  - **Classification according to Regulation (EC) No 1272/2008**
  - **Corrosion**
    - Met. Corr.1 H290 May be corrosive to metals.
  - **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**
    - Not applicable.
  - **Information concerning particular hazards for human and environment:**
    - The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
  - **Classification system:**
    - The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

- **2.2 Label elements**
  - **Labelling according to Regulation (EC) No 1272/2008**
    - The product is classified and labelled according to the CLP regulation.
  - **Hazard pictograms**
    - GHS05

- **Signal word** Warning
- **Hazard statements**
  - H290 May be corrosive to metals.
- **Precautionary statements**
  - P234 Keep only in original container.
  - P390 Absorb spillage to prevent material damage.
  - P406 Store in corrosive resistant container with a resistant inner liner.
- **Information concerning particular hazards for human and environment:**
  - **Safety phrases:**
    - 49 Keep only in the original container.
SECTION 3: Composition/information on ingredients

- 3.2 Chemical characterisation: Mixtures
  - Description:
    Aqueous solution.
    Also contains substances at levels not considered to be hazardous.
  - Dangerous components:
    - CAS: 7647-01-0
    - EINECS: 231-595-7
    - RTECS: MW 96200000
    - hydrochloric acid
    - C R34
    - Xi R37
    - Skin Corr. 1B, H314
    - STOT SE 3, H335
    - < 10%
  - Additional information: For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

- 4.1 Description of first aid measures
  - After inhalation: Supply fresh air; consult doctor in case of complaints.
  - After skin contact: Immediately wash with water and soap and rinse thoroughly.
  - After eye contact: Rinse opened eye for several minutes under running water.
  - After swallowing: Rinse mouth. Do not induce vomiting.
- 4.2 Most important symptoms and effects, both acute and delayed
  - No further relevant information available.
- 4.3 Indication of any immediate medical attention and special treatment needed
  - No further relevant information available.

SECTION 5: Firefighting measures

- 5.1 Extinguishing media
  - Suitable extinguishing agents:
    CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- 5.2 Special hazards arising from the substance or mixture
  - Formation of toxic gases is possible during heating or in case of fire.
- 5.3 Advice for firefighters
  - Protective equipment: Wear self-contained respiratory protective device.

SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures
  - Wear protective clothing.
- 6.2 Environmental precautions:
  - Dilute with plenty of water.
    Do not allow to enter sewers/ surface or ground water.
- 6.3 Methods and material for containment and cleaning up:
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- 6.4 Reference to other sections
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
SECTION 7: Handling and storage

- 7.1 Precautions for safe handling: Store in cool, dry place in tightly closed receptacles.
- 7.2 Conditions for safe storage, including any incompatibilities:
  - Storage:
    - Requirements to be met by storerooms and receptacles:
      - Store in a cool location.
      - Please refer to the manufacturer’s certificate for specific storage and transport temperature conditions.
      - Store only in the original receptacle.
      - Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
      - Information about storage in one common storage facility: Store away from foodstuffs.
      - Further information about storage conditions: None.
- 7.3 Specific end use(s): No further relevant information available.

SECTION 8: Exposure controls/personal protection

- Additional information about design of technical facilities: No further data; see item 7.
- 8.1 Control parameters:
  - Ingredients with limit values that require monitoring at the workplace:
    - 7647-01-0 hydrochloric acid
      - NES Peak limitation: 7.5 mg/m³, 5 ppm
  - Additional information: Lists used were valid at the time of SDS preparation.
- 8.2 Exposure controls:
  - Personal protective equipment:
    - General protective and hygienic measures: Wash hands before breaks and at the end of work.
    - Respiratory protection:
      - In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
    - Protection of hands:
      - Chemical-resistant, impervious gloves with an approved standards should be worn at all times.
      - The selection of the glove material is based on the penetration times, rates of diffusion and its degradation

Protective gloves

- Material of gloves:
  - PVC gloves
  - Neoprene gloves
- Penetration time of glove material:
  - The protection time of the gloves can not be accurately estimated for mixtures consisting of several substances
  - Refer to and observe manufacturers break through times of the protective gloves.
- Eye protection: Safety glasses
SECTION 9: Physical and chemical properties

- 9.1 Information on basic physical and chemical properties
  - General Information
    - Appearance:
      - Form: Liquid
      - Colour: Colourless
    - Odour:
      - Odour: Odourless
    - Odour threshold:
      - Odour threshold: Not determined.
  - pH-value at 20 °C:
    - pH-value: < 1.5
  - Change in condition
    - Melting point/Melting range:
      - Melting point/Melting range: Not determined.
    - Boiling point/Boiling range:
      - Boiling point/Boiling range: 100 °C
  - Flash point:
    - Flash point: Not applicable.
  - Flammability (solid, gaseous):
    - Flammability: Not determined.
  - Ignition temperature:
    - Decomposition temperature:
      - Decomposition temperature: Not determined.
    - Self-igniting:
      - Self-igniting: Product is not selfigniting.
    - Danger of explosion:
      - Danger of explosion: Not determined.
  - Explosion limits:
    - Lower:
      - Lower: Not determined.
    - Upper:
      - Upper: Not determined.
  - Vapour pressure at 20 °C:
    - Vapour pressure: 23 hPa
  - Density at 20 °C:
    - Density: 1.0111 g/cm³
  - Relative density:
    - Relative density: Not determined.
  - Vapour density:
    - Vapour density: Not determined.
  - Evaporation rate:
    - Evaporation rate: Not determined.
  - Solubility in / Miscibility with water:
    - Solubility: Fully miscible.
  - Partition coefficient (n-octanol/water):
    - Partition coefficient: Not determined.
  - Viscosity:
    - Dynamic:
      - Dynamic: Not determined.
    - Kinematic:
      - Kinematic: Not determined.
- 9.2 Other information:
  - No further relevant information available.
**SECTION 11: Toxicological information**

- **11.1 Information on toxicological effects**
  - **Acute toxicity:**
  - **Primary irritant effect:**
    - **on the skin:** No irritating effect.
    - **on the eye:** No irritating effect.
  - **Sensitisation:** No sensitising effects known.

**SECTION 12: Ecological information**

- **12.1 Toxicity**
  - **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
  - **General notes:**
    Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
    Do not allow undiluted product to reach ground water, water course or sewage system.
  - **12.5 Results of PBT and vPvB assessment**
    - **PBT:** Not applicable.
    - **vPvB:** Not applicable.
  - **12.6 Other adverse effects** No further relevant information available.

**SECTION 13: Disposal considerations**

- **13.1 Waste treatment methods**
  - **Recommendation:** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
  - **European waste catalogue**
    Waste disposal key numbers from EWC have to be assigned depending on origin and processing.
  - **Uncleaned packaging:**
    - **Recommendation:** Dispose of in accordance with national regulations.
  - **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

**SECTION 14: Transport information**

- **14.1 UN-Number**
  - **ADG, IMDG, IATA** UN1789
  - **ADG** 1789 HYDROCHLORIC ACID solution
  - **IMDG, IATA** HYDROCHLORIC ACID solution

(Contd. on page 6)
**Product name:** Ruthenium Standard: 10000 µg/mL Ru in 20% HCl [100ml bottle]

<table>
<thead>
<tr>
<th>14.3 Transport hazard class(es)</th>
</tr>
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<tbody>
<tr>
<td>ADG, IMDG, IATA</td>
</tr>
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</table>

| Class | 8 Corrosive substances. |
| Label | 8                      |

<table>
<thead>
<tr>
<th>14.4 Packing group</th>
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<tr>
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<tr>
<th>14.5 Environmental hazards:</th>
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<tr>
<td>Marine pollutant:</td>
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<tr>
<th>14.6 Special precautions for user</th>
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<tbody>
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<th>Danger code (Kemler):</th>
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<tr>
<td>EMS Number:</td>
<td>F-A,S-B</td>
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<tr>
<td>Segregation groups:</td>
<td>Acids</td>
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<tr>
<th>14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</th>
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<tr>
<td>Not applicable.</td>
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<tr>
<th>Transport/Additional information:</th>
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<tbody>
<tr>
<td>ADG</td>
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<tr>
<td>Limited quantities (LQ)</td>
</tr>
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<td>Transport category</td>
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<tr>
<td>Tunnel restriction code</td>
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</table>

| UN "Model Regulation": Un1789, HYDROCHLORIC ACID solution, 8, II |

**SECTION 15: Regulatory information**

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

- Philippines Inventory of Chemicals and Chemical Substances
  All ingredients are listed.

- Australian Inventory of Chemical Substances
  All ingredients are listed.

- Standard for the Uniform Scheduling of Medicines and Poisons
  7647-01-0 hydrochloric acid | S5, S6 |

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

**SECTION 16: Other information**

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.

Relevant phrases

- H314 Causes severe skin burns and eye damage.
- H335 May cause respiratory irritation.
- R34 Causes burns.
- R37 Irritating to respiratory system.

(Contd. on page 7)
Product name: Ruthenium Standard: 10000 µg/mL Ru in 20% HCl [100ml bottle]

· **Abbreviations and acronyms:**
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - IMDG: International Maritime Code for Dangerous Goods
  - IATA: International Air Transport Association
  - GHS: Globally Harmonised System of Classification and Labelling of Chemicals
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - ELINCS: European List of Notified Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - Met. Corr. 1: Corrosive to metals, Hazard Category 1
  - Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
  - STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

· **Sources**