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

1.1 Product identifier

Product name : Rhodium (III) 2-Ethyl Hexanoate Solution
Product code : 209006
Product description : Not available.
Product type : Liquid.
Other means of identification : Not available.

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

Identified uses
Catalyst.

1.3 Details of the supplier of the safety data sheet

Johnson Matthey Plc,
Orchard Road,
Royston,
Herts SG8 5HE

e-mail address of person responsible for this SDS : EHS_CCR@matthey.com

1.4 Emergency telephone number

Supplier
Telephone number : +44(0)1763253000
Hours of operation : 24 hours

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]
Acute Tox. 4, H332
Skin Irrit. 2, H315
Eye Irrit. 2, H319
STOT SE 3, H335 (Respiratory tract irritation)
The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

Ingredients of unknown toxicity : Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 15%

Classification according to Directive 1999/45/EC [DPD]
The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : Xn; R20
Xi; R36/37/38

Human health hazards : Harmful by inhalation. Irritating to eyes, respiratory system and skin.

Date of issue/Date of revision : 09/07/2015.
SECTION 2: Hazards identification

See Section 16 for the full text of the R phrases or H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms

Signal word: Warning
Hazard statements:
- Warning if inhaled.
- Causes serious eye irritation.
- Causes skin irritation.
- May cause respiratory irritation.

Precautionary statements

Prevention: Wear protective gloves or clothing. Wash hands thoroughly after handling.
Response: Get medical attention if you feel unwell. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Storage: Store locked up.
Disposal: Not applicable.
Hazardous ingredients:
- 2-Ethyl-1-hexanol
Supplemental label elements:
- Not applicable.

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

Special packaging requirements

Containers to be fitted with child-resistant fastenings: Not applicable.
Tactile warning of danger: Not applicable.

2.3 Other hazards

Other hazards which do not result in classification: 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>
</tr>
</thead>
<tbody>
<tr>
<td>2-Ethyl-1-hexanol</td>
<td>EC: 203-234-3, CAS: 104-76-7</td>
<td>&gt;=50 - &lt;75</td>
<td>Xn; R20, Xi; R36/37/38, STOT SE 3, H335 (Respiratory tract irritation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;10</td>
<td>R10, C; R35, Flam. Liq. 3, H226, Acute Tox. 4, H312, Acute Tox. 4, H332</td>
</tr>
</tbody>
</table>

Date of issue/Date of revision: 09/07/2015.
SECTION 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] Substance classified with a health or environmental hazard</td>
<td></td>
</tr>
<tr>
<td>[2] Substance with a workplace exposure limit</td>
<td></td>
</tr>
<tr>
<td>[5] Substance of equivalent concern</td>
<td></td>
</tr>
</tbody>
</table>

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

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, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

**Eye contact**
- 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.

**Inhalation**
- Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. 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**
- Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Clean shoes thoroughly before reuse.

**Ingestion**
- 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. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

4.2 Most important symptoms and effects, both acute and delayed

**Potential acute health effects**
- **Eye contact**: Causes serious eye irritation.
- **Inhalation**: Harmful if inhaled. May cause respiratory irritation.
- **Skin contact**: Causes skin irritation.
- **Ingestion**: Irritating to mouth, throat and stomach.

**Over-exposure signs/symptoms**

Date of issue/Date of revision: 09/07/2015.
SECTION 4: First aid measures

**Eye contact**: Adverse symptoms may include the following:
- pain or irritation
- watering
- redness

**Inhalation**: Adverse symptoms may include the following:
- respiratory tract irritation
- coughing

**Skin contact**: Adverse symptoms may include the following:
- irritation
- redness

**Ingestion**: No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

**Notes to physician**: No specific treatment.

**Specific treatments**: None identified.

SECTION 5: Firefighting measures

5.1 Extinguishing media

**Suitable extinguishing media**: Use an extinguishing agent suitable for the surrounding fire.

**Unsuitable extinguishing media**: None known.

5.2 Special hazards arising from the substance or mixture

**Hazards from the substance or mixture**: In a fire or if heated, a pressure increase will occur and the container may burst.

**Hazardous thermal decomposition products**: Decomposition products may include the following materials:
- carbon dioxide
- carbon monoxide
- metal oxide/oxides

5.3 Advice for firefighters

**Special protective actions for fire-fighters**: 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**: 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.

**Additional information**: None identified.

**Remark**: The residue, ash or char left after a fire may have catalytic properties and may promote the re-ignition of flammable materials and vapours.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel**: 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 spill material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders**: 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".

Date of issue/Date of revision: 09/07/2015.
## SECTION 6: Accidental release measures

### 6.2 Environmental precautions
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).

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

#### Small spill
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.

#### Large spill
Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product.

### 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

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

### 7.1 Precautions for safe handling

#### Protective measures
Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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

### 7.3 Specific end use(s)

#### Recommendations
Not available.

#### Industrial sector specific solutions
Not available.

## SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. Information is provided based on typical anticipated uses of the product. Additional measures might be required for bulk handling or other uses that could significantly increase worker or exposure or environmental releases.

### 8.1 Control parameters

#### Occupational exposure limits

**Date of issue/Date of revision**: 09/07/2015.
### SECTION 8: Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Exposure limit values</th>
</tr>
</thead>
</table>
| rhodium tris(2-ethylhexanoate) | EH40/2005 WELs (United Kingdom (UK), 12/2011).  
TWA: 0.001 mg/m³, (as Rh) 8 hours.  
STEL: 0.003 mg/m³, (as Rh) 15 minutes.  |
| acetic acid | EU OEL (Europe, 12/2009). Notes: list of indicative occupational exposure limit values  
TWA: 10 ppm 8 hours.  
TWA: 25 mg/m³ 8 hours. |

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

**DNELs/DMELs**

No DNELs/DMELs available.

**PNECs**

No PNECs available.

#### 8.2 Exposure controls

**Appropriate engineering controls**: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**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. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection**: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

**Skin protection**

**Hand protection**: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection**: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection**: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
SECTION 8: Exposure controls/personal protection

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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

Physical state : Liquid.

Colour : Red. [Dark]

Odour : Sweetish.

Odour threshold : Not available.

pH : Not available.

Melting point/freezing point : Not available.

Initial boiling point and boiling range : 184°C

Flash point : Closed cup: 61 to 93.3°C [Expert judgment]

Open cup: Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : The residue, ash or char left after a fire may have catalytic properties and may promote the re-ignition of flammable materials and vapours.

Upper/lower flammability or explosive limits : Not available.

Vapour pressure : Not available.

Vapour density : Not available.

Relative density : Not available.

Solubility(ies) : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : 280°C

Decomposition temperature : Not available.

Viscosity : Not available.

Explosive properties : None identified.

Oxidising properties : Not available.

Minimum ignition energy (mJ) : Not applicable.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity : No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability : The catalytic properties of this material may give it a low ignition temperature (except when supplied as a paste). The catalytic properties will also promote the oxidation and possible ignition of flammable liquids and vapours. A used, filtered catalyst should, therefore, be kept wet and out of contact with combustible vapours and liquids. The material is supplied in a stable condition and other than the previously mentioned catalytic hazards of this material, no specific reactive hazards are known.
SECTION 10: Stability and reactivity

10.3 Possibility of hazardous reactions
: Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid
: No specific data.

10.5 Incompatible materials
: No specific data.

10.6 Hazardous decomposition products
: 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>2-Ethyl-1-hexanol</td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>1970 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3730 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>acetic acid</td>
<td>LC50 Inhalation Vapour</td>
<td>Rat</td>
<td>11000 mg/m³</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>1060 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3310 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary
: Not available.

Acute toxicity estimates

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal</td>
<td>12013.3 mg/kg</td>
</tr>
<tr>
<td>Inhalation (vapours)</td>
<td>124.7 mg/l</td>
</tr>
<tr>
<td>Inhalation (dusts and mists)</td>
<td>1.848 mg/l</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>2-Ethyl-1-hexanol</td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 20 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>20 Micrograms</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>20 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>415</td>
<td>milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 milligrams</td>
<td>-</td>
</tr>
<tr>
<td>acetic acid</td>
<td>Skin - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>0.5 Milliliters</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>0.5 minutes</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Human</td>
<td>-</td>
<td>5 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 50 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 50 milligrams</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>525 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary
: Not available.

Sensitisation
: Not available.

Mutagenicity
: Not available.
SECTION 11: Toxicological information

**Potential acute health effects**

**Inhalation**
- Harmful if inhaled. May cause respiratory irritation.
- Irritating to mouth, throat and stomach.

**Ingestion**
- Causes skin irritation.

**Skin contact**
- Irritating to mouth, throat and stomach.

**Eye contact**
- Causes serious eye irritation.

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

**Eye contact**
- Adverse symptoms may include the following:
  - Pain or irritation
  - Watering
  - Redness

**Inhalation**
- Adverse symptoms may include the following:
  - Respiratory tract irritation
  - Coughing

---

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Experiment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetic acid</td>
<td>471 Bacterial Reverse Mutation Test</td>
<td>Experiment: In vitro Subject: Bacteria Metabolic activation: with</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>473 In vitro Mammalian Chromosomal Aberration Test</td>
<td>Experiment: In vitro Subject: Mammalian-Animal Cell: Germ Metabolic activation: with and without</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>EU B.12</td>
<td>Experiment: In vivo Subject: Mammalian-Animal</td>
<td>Negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Carcinogenicity</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetic acid</td>
<td>Negative - Oral - TCLo</td>
<td>Human - Male, Female</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion/Summary**

Carcinogenicity: Not available.

Reproductive toxicity: Not available.

Teratogenicity: Not available.

Specific target organ toxicity (single exposure)

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Ethyl-1-hexanol</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Respiratory tract irritation</td>
</tr>
</tbody>
</table>

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

Not available.

Date of issue/Date of revision: 09/07/2015.
SECTION 11: Toxicological information

Skin contact: Adverse symptoms may include the following:
- irritation
- redness

Ingestion: 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

<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>acetic acid</td>
<td>Sub-chronic NOAEL Oral</td>
<td>Rat - Male</td>
<td>290 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary: Not available.

General: No known significant effects or critical hazards.

Carcinogenicity: No known significant effects or critical hazards.

Mutagenicity: No known significant effects or critical hazards.

Teratogenicity: No known significant effects or critical hazards.

Developmental effects: No known significant effects or critical hazards.

Fertility effects: No known significant effects or critical hazards.

Other adverse symptoms: Not available.

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>2-Ethyl-1-hexanol</td>
<td>Acute LC50 28200 to 29500 μg/l Fresh water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
<tr>
<td>acetic acid</td>
<td>Acute EC50 73400 μg/l Fresh water</td>
<td>Algae - Navicula seminulum</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 65000 μg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 50.1 ul/L Marine water</td>
<td>Crustaceans - Artemia sp.</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 75000 μg/l Fresh water</td>
<td>Fish - Lepomis macrochirus</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

Conclusion/Summary: Not available.

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>acetic acid</td>
<td>-</td>
<td>96 % - Readily - 20 days</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary: 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>acetic acid</td>
<td>-</td>
<td>50%; &lt; 28 day(s)</td>
<td>Readily</td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential
Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II - United Kingdom (UK)

**SECTION 12: Ecological information**

<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>2-Ethyl-1-hexanol</td>
<td>2.9</td>
<td></td>
<td>low</td>
</tr>
<tr>
<td>acetic acid</td>
<td>-0.17</td>
<td>25.33</td>
<td>low</td>
</tr>
</tbody>
</table>

12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)**

Mobility: Not available.

12.5 Results of PBT and vPvB assessment

**PBT**: Not applicable.

**vPvB**: Not applicable.

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

**SECTION 13: Disposal considerations**

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

**Product**

**Methods of disposal**: The generation of waste should be avoided or minimised wherever possible. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Return accumulated waste material to the refinery for metal recovery, or dispose of in accordance with local and national regulations.

**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**

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>ADR/RID</th>
<th>ADN</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
</table>

| 14.2 UN proper shipping name | - | - | - | - |

| 14.3 Transport hazard class(es) | - | - | - | - |

| 14.4 Packing group | - | - | - | - |

| 14.5 Environmental hazards | No. | No. | No. | No. |

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SECTION 14: Transport information

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 73/78 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

- Not applicable.

Other EU regulations

- Europe inventory: All components are listed or exempted.
- Seveso II Directive
  - This product is not controlled under the Seveso II Directive.
- International regulations
  - Chemical Weapon Convention List Schedules I, II & III Chemicals
    - Not listed.
  - Montreal Protocol (Annexes A, B, C, E)
    - Not listed.
  - Stockholm Convention on Persistent Organic Pollutants
    - Not listed.
  - Rotterdam Convention on Prior Inform Consent (PIC)
    - Not listed.
  - UNECE Aarhus Protocol on POPs and Heavy Metals
    - Not listed.

International lists

National inventory

- Australia: Not determined.
- Canada: All components are listed or exempted.
- China: All components are listed or exempted.
- Japan: Not determined.
- Malaysia: Not determined.
- New Zealand: Not determined.
- Philippines: Not determined.

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SECTION 15: Regulatory information

**Republic of Korea**: All components are listed or exempted.

**Taiwan**: All components are listed or exempted.

**United States**: United States inventory (TSCA 8b): All components are listed or exempted.

**15.2 Chemical Safety Assessment**: This product contains substances for which Chemical Safety Assessments are still required.

**Republic of Korea**: All components are listed or exempted.

**Taiwan**: All components are listed or exempted.

**United States**: United States inventory (TSCA 8b): All components are listed or exempted.

SECTION 16: Other information

- **ATE** = Acute Toxicity Estimate
- **CLP** = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
- **DMEL** = Derived Minimal Effect Level
- **DNEL** = Derived No Effect Level
- **EUH statement** = CLP-specific Hazard statement
- **PBT** = Persistent, Bioaccumulative and Toxic
- **PNEC** = Predicted No Effect Concentration
- **RRN** = REACH Registration Number
- **vPvB** = Very Persistent and Very Bioaccumulative

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

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Tox. 4, H332</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Skin Irrit. 2, H315</td>
<td>Calculation method</td>
</tr>
<tr>
<td>Eye Irrit. 2, H319</td>
<td>Calculation method</td>
</tr>
<tr>
<td>STOT SE 3, H335 (Respiratory tract irritation)</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

**Full text of abbreviated H statements**

- H226: Flammable liquid and vapour.
- H312 (dermal): Harmful in contact with skin.
- H314: Causes severe skin burns and eye damage.
- H315: Causes skin irritation.
- H318: Causes serious eye damage.
- H319: Causes serious eye irritation.
- H332: Harmful if inhaled.
- H332 (inhalation): Harmful if inhaled.
- H335 (Respiratory tract irritation): May cause respiratory irritation. (Respiratory tract irritation)
- H413: May cause long lasting harmful effects to aquatic life.

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

- Acute Tox. 4, H312: ACUTE TOXICITY (dermal) - Category 4
- Acute Tox. 4, H332: ACUTE TOXICITY (inhalation) - Category 4
- Aquatic Chronic 4, H413: LONG-TERM AQUATIC HAZARD - Category 4
- Eye Dam. 1, H318: SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
- Eye Irrit. 2, H319: SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
- Flam. Liq. 3, H226: FLAMMABLE LIQUIDS - Category 3
- Skin Corr. 1A, H314: SKIN CORROSION/IRRITATION - Category 1A
- Skin Irrit. 2, H315: SKIN CORROSION/IRRITATION - Category 2
- STOT SE 3, H335 (Respiratory tract irritation): SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

**Full text of abbreviated R phrases**

- R10- Flammable.
- R20- Harmful by inhalation.
- R35- Causes severe burns.
- R36/37/38- Irritating to eyes, respiratory system and skin.
- R53- May cause long-term adverse effects in the aquatic environment.

**Full text of classifications [DSD/DPD]**

- C - Corrosive
- Xn - Harmful
- Xi - Irritant

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SECTION 16: Other information

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Version : 0.01

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