SAFETY DATA SHEET

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

1.1. Product identifier
Name of the substance: Kerosene - All Grades (Refer to Synonyms for Product Name)
Identification number: 649-423-00-8
Registration number: 01-2119502385-46-0021
Synonyms: Kerosene, Unmarked * Kerosene, Marked
SDS number: 2009
Issue date: 28-July-2011
Version number: 05
Revision date: 28-June-2013
Supersedes date: 17-August-2012

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

Uses advised against: None known.

1.3. Details of the supplier of the safety data sheet
Supplier
Company name: Valero Energy Ltd
Address: 1 Westferry Circus
Canary Wharf
London E14 4HA
UK
Telephone: 01/210 345 4593 (General information; US)
e-mail: CorpHSE@valero.com
Contact person: Industrial Hygienist

1.4. Emergency telephone number
0044/(0)18 65 407333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Directive 67/548/EEC or 1999/45/EC as amended
Classification: R10, Xn; R65, Xi; R38, N; R51/53
The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/2008 as amended
Physical hazards
Flammable liquids
Category 3
H226 - Flammable liquid and vapour.

Health hazards
Skin corrosion/irritation
Category 2
H315 - Causes skin irritation.
Specific target organ toxicity - single exposure
Category 3 narcotic effects
H336 - May cause drowsiness or dizziness.
Aspiration hazard
Category 1
H304 - May be fatal if swallowed and enters airways.

Environmental hazards
Hazardous to the aquatic environment, long-term aquatic hazard
Category 2
H411 - Toxic to aquatic life with long lasting effects.

Hazard summary
Physical hazards: Flammable.
Health hazards: Harmful: may cause lung damage if swallowed. Irritating to skin.
Environmental hazards: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Specific hazards

Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. Prolonged and repeated contact with the product may cause skin cancer. Components of the product may be absorbed into the body through the skin. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia. Material will float and can be re-ignited on surface of water.

Main symptoms

Irritation of eyes and mucous membranes. Skin irritation. Dermatitis. Ingestion may cause irritation and malaise.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains:

Kerosine (petroleum), sweetened

Identification number

649-423-00-8

Hazard pictograms

Signal word

Danger

Hazard statements

H226 - Flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H336 - May cause drowsiness or dizziness.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Response

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
P331 - Do NOT induce vomiting.

Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information

Not applicable.

2.3. Other hazards

Static accumulator - Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name

Kerosine (petroleum), sweetened

% CAS-No. / EC No. REACH Registration No. INDEX No. Notes

100 64742-81-0 01-2119502385-46-0021 649-423-00-8

Classification:

DSD: R10, Xn;R65, Xi;R38, N;R51/53

CLP: Flam. Liq. 3; H226, Asp. Tox. 1; H304, Skin Irrit. 2; H315, STOT SE 3; H336, Aquatic Chronic 2; H411

DSD: Directive 67/548/EEC.

Composition comments

The product is a UVCB substance. The full text for all R- and H-phrases is displayed in section 16. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

General information

If exposed or concerned: get medical attention/advice. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

4.1. Description of first aid measures

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Skin contact

Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

Ingestion
Rinse mouth thoroughly. Do not induce vomiting without advice from poison control centre. Do not give mouth-to-mouth resuscitation. Get medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards
The product is flammable, and heating may generate vapours which may form explosive vapour/air mixtures. Containers may explode when heated.

5.1. Extinguishing media
Suitable extinguishing media

Unsuitable extinguishing media
Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture
Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

5.3. Advice for firefighters
Special protective equipment for firefighters
Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Special fire fighting procedures
Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discolouration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapours may form explosive air mixtures even at room temperature. Prevent buildup of vapours or gasses to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
For non-emergency personnel
Keep unnecessary personnel away. Local authorities should be advised if significant spillages cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

For emergency responders
Keep unnecessary personnel away. Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions
Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire and Explosion Hazard Data before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies.
6.3. Methods and material for containment and cleaning up

Extinguish all flames in the vicinity.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.

Small Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Cover with plastic sheet to prevent spreading. Following product recovery, flush area with water. Clean surface thoroughly to remove residual contamination. Wipe up with absorbent material (e.g. cloth, fleece).

Never return spills in original containers for re-use. Prevent entry into waterways, sewers, basements or confined areas. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Should not be released into the environment. This material and its container must be disposed of as hazardous waste. Use non-sparking tools and explosion-proof equipment.

6.4. Reference to other sections

For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Before entering storage tanks and commencing any operation in a confined area check the atmosphere for oxygen content and flammability. Provide adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid inhalation of vapours. Wear appropriate personal protective equipment. The product is flammable, and heating may generate vapours which may form explosive vapour/air mixtures. Ground container and transfer equipment to eliminate static electric sparks. Vapours are heavier than air and may travel along the floor and in the bottom of containers. Immediately change contaminated clothes. Do not eat, drink or smoke when using the product. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities


7.3. Specific end use(s)

For detailed information, see section 1.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Belgium. Exposure Limit Values.

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td>TWA</td>
<td>200 mg/m³</td>
<td>Vapor.</td>
</tr>
</tbody>
</table>

Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work

<table>
<thead>
<tr>
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<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
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<td>300 mg/m³</td>
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</table>

Italy. OELs

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td>TWA</td>
<td>200 mg/m³</td>
<td>Non-aerosol.</td>
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</tbody>
</table>

Poland. MACs. Minister of Labour and Social Policy Regarding Maximum Allowable Concentrations and Intensities in Working Environment

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td>STEL</td>
<td>300 mg/m³</td>
</tr>
</tbody>
</table>

TWA | 100 mg/m³ |
### Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

<table>
<thead>
<tr>
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<th>Value</th>
<th>Form</th>
</tr>
</thead>
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<td>TWA</td>
<td>200 mg/m³</td>
<td>Non-aerosol.</td>
</tr>
</tbody>
</table>

#### Biological limit values

No biological exposure limits noted for the ingredient(s).

#### Recommended monitoring procedures

Follow standard monitoring procedures.

#### Derived no-effect level (DNEL)

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Route</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td>Workers</td>
<td>Inhalation</td>
<td>40 mg/kg/24h</td>
<td>Long term exposure systemic effects</td>
</tr>
</tbody>
</table>

Predicted no effect concentrations (PNECs)

Not available.

### 8.2. Exposure controls

- **Appropriate engineering controls**
  
  Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

- **Individual protection measures, such as personal protective equipment**

  - **General information**
    
    Use personal protective equipment as required. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Keep working clothes separately. Launder contaminated clothing before reuse.

  - **Eye/face protection**
    
    Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

  - **Skin protection**
    
    - **Hand protection**
      
      Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Wear suitable gloves tested to EN374.
    
    - **Other**
      
      Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

  - **Respiratory protection**
    
    Wear a NIOSH-approved (or equivalent) full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. In case of inadequate ventilation or risk of inhalation of vapours, use suitable respiratory equipment with gas filter (type A2). Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

  - **Thermal hazards**
    
    When material is heated, wear gloves to protect against thermal burns.

  - **Hygiene measures**
    
    Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practices.

- **Environmental exposure controls**

  Contain spills and prevent releases and observe national regulations on emissions.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

- **Appearance**
  
  Colourless liquid.

- **Physical state**
  
  Liquid.

- **Form**
  
  Liquid.

- **Colour**
  
  Colourless.

- **Odour**
  
  Kerosene (strong).

- **Odour threshold**
  
  Not available.

- **pH**
  
  Not available.

- **Melting point/freezing point**
  
  Not available.

- **Initial boiling point and boiling range**
  
  90 - 320 °C (194 - 608 °F)

- **Flash point**
  
  29.0 - 70.0 °C (84.2 - 158.0 °F)

- **Evaporation rate**
  
  No data available.

- **Flammability (solid, gas)**
  
  Not applicable.
### Upper/lower flammability or explosive limits

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability limit - lower (%)</td>
<td>0.7 % v/v</td>
</tr>
<tr>
<td>Flammability limit - upper (%)</td>
<td>5 % v/v</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>&lt;1 - 3.7 (kPa) (37.8°C)</td>
</tr>
<tr>
<td>Vapour density</td>
<td>4.5</td>
</tr>
<tr>
<td>Relative density</td>
<td>750 - 840 kg/m^3 (15°C)</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>220 - 250 °C (428 - 482 °F)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>1 - 2.4 cSt (40°C)</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive.</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not oxidizing.</td>
</tr>
</tbody>
</table>

### 9.2. Other information

- **Density**: 0.77 - 0.85 g/cm³ (15°C)

### SECTION 10: Stability and reactivity

10.1. Reactivity

- The product is stable and non reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

- Stable under normal temperature conditions and recommended use.

10.3. Possibility of hazardous reactions

- Hazardous reactions do not occur.

10.4. Conditions to avoid

- Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.

10.5. Incompatible materials

- Strong acids. Strong oxidizers such as nitrates, chlorates, peroxides.

10.6. Hazardous decomposition products

- Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

### SECTION 11: Toxicological information

#### General information

Occupational exposure to the substance or mixture may cause adverse effects.

#### Information on likely routes of exposure

**Ingestion**

- Ingestion may cause irritation and malaise. Swallowing or vomiting of the liquid may result in aspiration into the lungs.

**Inhalation**

- Breathing of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of co-ordination. Continued inhalation may result in unconsciousness.

**Skin contact**

- Causes skin irritation. Repeated exposure may cause skin dryness or cracking. May be absorbed through the skin.

**Eye contact**

- Direct contact with eyes may cause temporary irritation.

#### Symptoms


### 11.1. Information on toxicological effects

#### Acute toxicity

- Breathing of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of co-ordination. Continued inhalation may result in unconsciousness. May irritate and cause stomach pain, vomiting, diarrhoea and nausea. Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity. However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapour.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50</td>
<td>Rabbit</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>Inhalation LC50</td>
<td>Rat</td>
<td>&gt; 5280 mg/m^3</td>
</tr>
</tbody>
</table>
### Test results

<table>
<thead>
<tr>
<th>Product</th>
<th>species</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
</tbody>
</table>

- **Skin corrosion/irritation**
  - Causes skin irritation.

- **Serious eye damage/eye irritation**
  - Based on available data, the classification criteria are not met.

- **Respiratory sensitisation**
  - Based on available data, the classification criteria are not met.

- **Skin sensitisation**
  - Based on available data, the classification criteria are not met.

- **Germ cell mutagenicity**
  - Based on available data, the classification criteria are not met.

- **Carcinogenicity**
  - Based on available data, the classification criteria are not met.

- **Reproductive toxicity**
  - Based on available data, the classification criteria are not met.

- **Specific target organ toxicity - single exposure**
  - Based on available data, the classification criteria are not met.

- **Specific target organ toxicity - repeated exposure**
  - Based on available data, the classification criteria are not met.

- **Aspiration hazard**
  - May be fatal if swallowed and enters airways.

- **Mixture versus substance information**
  - Not applicable.

- **Other information**
  - Symptoms may be delayed.

### SECTION 12: Ecological information

#### 12.1. Toxicity
- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosine (petroleum), sweetened (CAS 64742-81-0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aquatic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algae</td>
<td>EL50</td>
<td>1 - 3 mg/l, 72 Hours</td>
</tr>
<tr>
<td>Crustacea</td>
<td>EL50</td>
<td>1.4 mg/l, 48 Hours</td>
</tr>
<tr>
<td>Fish</td>
<td>LL50</td>
<td>2 - 5 mg/l, 96 Hours</td>
</tr>
</tbody>
</table>

- **12.2. Persistence and degradability**
  - An evaluation of representative hydrocarbon structures indicates some structures meet the persistent (P) or very persistent (vP) criteria.

- **12.3. Bioaccumulative potential**
  - The product does not contain any substances expected to be bioaccumulating.

- **Partition coefficient n-octanol/water (log Kow)**
  - Not available.

- **Bioconcentration factor (BCF)**
  - Not available.

- **12.4. Mobility in soil**
  - Not available.

- **Mobility in general**
  - The product is insoluble in water. It will spread on the water surface while some of the components will eventually sediment in water systems. The volatile components of the product will spread in the atmosphere.

- **12.5. Results of PBT and vPvB assessment**
  - Not a PBT or vPvB substance or mixture.

- **12.6. Other adverse effects**
  - Toxic to aquatic life with long lasting effects. The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

- **Residual waste**
  - Dispose of in accordance with local regulations.

- **Contaminated packaging**
  - Since emptied containers may retain product residue, follow label warnings even after container is emptied.

- **EU waste code**
  - 13 07 02*
  - 13 07 03*
  - Waste codes should be assigned by the user based on the application for which the product was used.

- **Disposal methods/information**
  - Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Do not discharge into drains, water courses or onto the ground.
### ADR

<table>
<thead>
<tr>
<th>14.1. UN number</th>
<th>UN1223</th>
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<tbody>
<tr>
<td>14.2. UN proper shipping name</td>
<td>Kerosene</td>
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<tr>
<td>14.3. Transport hazard class(es)</td>
<td>3</td>
</tr>
<tr>
<td>Subsidiary class(es)</td>
<td>-</td>
</tr>
<tr>
<td>14.4. Packing group</td>
<td>III</td>
</tr>
<tr>
<td>14.5. Environmental hazards</td>
<td>Yes</td>
</tr>
<tr>
<td>Tunnel restriction code</td>
<td>D/E</td>
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<tr>
<td>Labels required</td>
<td>3</td>
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<tr>
<td>14.6. Special precautions for user</td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
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### RID

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<td>14.5. Environmental hazards</td>
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<td>14.6. Special precautions for user</td>
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### ADN

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<td>14.5. Environmental hazards</td>
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<td>Labels required</td>
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<td>Marine pollutant</td>
<td>Yes</td>
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<td>ERG code</td>
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<td>14.6. Special precautions for user</td>
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### IATA

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</tr>
</thead>
<tbody>
<tr>
<td>14.2. UN proper shipping name</td>
<td>Kerosene</td>
</tr>
<tr>
<td>14.3. Transport hazard class(es)</td>
<td>3</td>
</tr>
<tr>
<td>Subsidiary class(es)</td>
<td>-</td>
</tr>
<tr>
<td>14.4. Packing group</td>
<td>III</td>
</tr>
<tr>
<td>14.5. Environmental hazards</td>
<td>Yes</td>
</tr>
<tr>
<td>Labels required</td>
<td>3</td>
</tr>
<tr>
<td>ERG code</td>
<td>3L</td>
</tr>
<tr>
<td>14.6. Special precautions for user</td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
</tbody>
</table>

### IMDG

<table>
<thead>
<tr>
<th>14.1. UN number</th>
<th>UN1223</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2. UN proper shipping name</td>
<td>KEROSENE</td>
</tr>
<tr>
<td>14.3. Transport hazard class(es)</td>
<td>3</td>
</tr>
<tr>
<td>Subsidiary class(es)</td>
<td>-</td>
</tr>
<tr>
<td>14.4. Packing group</td>
<td>III</td>
</tr>
<tr>
<td>14.5. Environmental hazards</td>
<td>Marine pollutant Yes</td>
</tr>
<tr>
<td>Labels required</td>
<td>3</td>
</tr>
<tr>
<td>EmS</td>
<td>F-E, S-E</td>
</tr>
<tr>
<td>14.6. Special precautions for user</td>
<td>Read safety instructions, MSDS and emergency procedures before handling.</td>
</tr>
</tbody>
</table>
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

SECTION 15: Regulatory information

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

EU regulations

- Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I
  Not listed.
- Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II
  Not listed.
  Not listed.
- Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended
  Not listed.
- Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended
  Not listed.
- Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as amended
  Not listed.
- Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended
  Not listed.
- Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry
  Not listed.
- Regulation (EC) No. 1907/2006, REACH Article 59(1) Candidate List as currently published by ECHA
  Not listed.

Authorisations

- Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended
  Not listed.

Restrictions on use

- Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended
  Not listed.
- Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work
  Not regulated.
- Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding
  Not regulated.

Other EU regulations

- Directive 96/82/EC (Seveso II) on the control of major-accident hazards involving dangerous substances
  Not regulated.
- Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
  Kerosine (petroleum), sweetened (CAS 64742-81-0)
- Directive 94/33/EC on the protection of young people at work
  Not listed.

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended and respective national laws implementing EC directives. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006. 96/82/EC (Seveso II) Directive; Part 2 (Classified Substances) - Dangerous for the Environment (i)

National regulations

Follow national regulation for work with chemical agents.

15.2. Chemical safety assessment

For this substance a chemical safety assessment has been carried out.
SECTION 16: Other information

List of abbreviations
- DSD: Directive 67/548/EEC.
- DNEL: Derived No-Effect Level.
- PNEC: Predicted No-Effect Concentration.
- PBT: Persistent, bioaccumulative and toxic.
- vPvB: Very Persistent and very Bioaccumulative.
- eSDS: extended Safety Data Sheet.
- STP: Sewage Treatment Plant.

References
- Chemical safety report.
- CLP files – http://concawe.org/

Information on evaluation method leading to the classification of mixture
The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.

Full text of any statements or R-phrases and H-statements under Sections 2 to 15
- R10 Flammable.
- R38 Irritating to skin.
- R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- R65 Harmful: may cause lung damage if swallowed.
- H226 Flammable liquid and vapour.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H336 May cause drowsiness or dizziness.
- H411 Toxic to aquatic life with long lasting effects.

This SDS contains revisions in the following section(s):
This safety data sheet contains revisions in the following section(s): 1, 3, 4, 6, 7, 8, 9, 11, 12, 14, 16.

Training information
Follow training instructions when handling this material.

Disclaimer
This material Safety Data Sheet (SDS) was prepared in accordance with EC No 1272/2008 by Valero Energy Ltd. Valero Energy Ltd. does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this SDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use, the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.
Annex to the extended Safety Data Sheet (eSDS)

1 - Exposure Scenario Worker

1. Distribution of substance

List of use descriptors

Sector(s) of Use: SU3: Industrial uses.
Product categories [PC]: Not available.

Name of contributing environmental scenario and corresponding ERC

ERC1: Manufacture of substances.
ERC2: Formulation of preparations.
ERC3: Formulation in materials.
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles.
ERC5: Industrial use resulting in inclusion into or onto a matrix.
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates).
ERC6b: Industrial use of reactive processing aids.
ERC6c: Industrial use of monomers for manufacture of thermoplastics.
ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.
ERC7: Industrial use of substances in closed systems.

Specific Environmental Release Category: ESVOC SpERC 1.1b.v1

List of names of contributing worker scenarios and corresponding PROCs

PROC1: Use in closed process, no likelihood of exposure.
PROC2: Use in closed, continuous process with occasional controlled exposure.
PROC3: Use in closed batch process (synthesis or formulation).
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises.
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
PROC15: Use as laboratory reagent.

Further explanations

Other Process or activity: Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities.


Product characteristics

Concentration of the substance in a mixture: Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.

Physical state: Liquid

Viscosity

Kinematic viscosity: 1,6 mm²/s 40 °C
Dynamic viscosity: Not available.

Amounts used

Fraction of EU tonnage used in region: 0,1
Regional use tonnage (tons/year): 5,4 e6
Fraction of Regional tonnage used locally: 0,002
Annual site tonnage (tons/year): 1,1 e4
Maximum daily site tonnage (kg/day): 3,6 e4

Frequency and duration of use

Batch process: Not available.
Continuous process: Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor: 10
Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Type</th>
<th>Emission days (days/year)</th>
<th>Air</th>
<th>Emission factors</th>
<th>Soil</th>
<th>Water</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>initial release</td>
<td>300</td>
<td>0,001</td>
<td>0,00001</td>
<td>0,00001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>prior to RMM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

- **Air**: Treat air emission to provide a typical removal efficiency of (%) 90
- **Soil**: Not available.
- **Water**: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
- **Sediment**: Not available.
- **Remarks**: Risk from environmental exposure is driven by freshwater sediment. No wastewater treatment required.

Organisational measures to prevent/limit release from site

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

<table>
<thead>
<tr>
<th>Type</th>
<th>Municipal STP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge rate</td>
<td>2000</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
<td>94,7</td>
</tr>
<tr>
<td>Sludge treatment technique</td>
<td>Not available.</td>
</tr>
<tr>
<td>Measures to limit air emissions</td>
<td>Not available.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 2,6e6</td>
</tr>
<tr>
<td>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</td>
<td>94,7</td>
</tr>
</tbody>
</table>

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

- **Suitable waste treatment**: Not available.
- **Disposal methods**: Not available.
- **Treatment effectiveness**: Not available.
- **Remarks**: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

- **Suitable recover operations**: External recovery and recycling of waste should comply with applicable local and/or national regulations.
- **Treatment effectiveness**: Not available.
- **Remarks**: Not available.

Additional good practice advice beyond the REACH CSA

Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.
2.2. Contributing exposure scenario controlling worker exposure for Use in closed process, no likelihood of exposure.

Process categories beyond the REACH CSA

- Use in closed, continuous process with occasional controlled exposure.
- Use in closed batch process (synthesis or formulation).
- Use in batch and other process (synthesis) where opportunity for exposure arises.
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
- Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
- Use as laboratory reagent.

Product characteristics

- Concentration of the substance in a mixture: Covers percentage substance in the product up to 100% (unless stated differently).
- Physical form of the product: Liquid
- Vapour pressure: Liquid, vapour pressure 0.5 - 10 kPa at STP.
- Process temperature: Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Amounts used
Not available.

Frequency and duration of use

- Covers daily exposures up to 8 hours (unless stated differently).
- Duration: 8
- Frequency of use: 1 hours per day
- Remarks: Assumes a good basic standard of occupational hygiene is implemented.

Human factors not influenced by risk management

Exposed skin areas
Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

- Area of use
- Room size
- Temperature
- Ventilation rate
- Remarks

Other relevant operational conditions
Not available.

Risk management measures (RMM)

- Technical conditions and measures at process level (source) to prevent release: Not available.
- Technical conditions and measures to control dispersion from source towards the worker: Not available.
- Organizational measures to prevent/limit releases, dispersion and exposure: Not available.
- Conditions and measures related to personal protection, hygiene and health evaluations: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

3. Exposure Estimation

Environment
See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

Health

<table>
<thead>
<tr>
<th>Exposure level</th>
<th>RCR</th>
<th>Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>General exposures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(closed systems)</td>
<td>0.01 ppm</td>
<td>0</td>
<td>**</td>
</tr>
<tr>
<td>General exposures</td>
<td>10 ppm</td>
<td>0.250</td>
<td>**</td>
</tr>
<tr>
<td>(closed systems)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General exposures</td>
<td>25 ppm</td>
<td>0.625</td>
<td>**</td>
</tr>
<tr>
<td>(closed systems)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

**Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

**Health**

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.

Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
2 - Exposure Scenario Worker

1. Formulation [mixing] of preparations and/or re-packaging

List of use descriptors

- SU3: Industrial uses.
- SU10: Formulation [mixing] of preparations and/or re-packaging.

Product categories [PC]:

- Not available.

Name of contributing environmental scenario and corresponding ERC

- ERC2: Formulation of preparations.

Specific Environmental Release Category: ESVOC SpERC 2.2.v1

List of names of contributing worker scenarios and corresponding PROCs

- PROC1: Use in closed process, no likelihood of exposure.
- PROC2: Use in closed, continuous process with occasional controlled exposure.
- PROC3: Use in closed batch process (synthesis or formulation).
- PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises.
- PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
- PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
- PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
- PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
- PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
- PROC15: Use as laboratory reagent.

Further explanations

Other Process or activity

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.


Product characteristics

Concentration of the substance in a mixture

Covers percentage substance in the product up to 100 % (unless stated differently).

Substance is complex UVCB. Predominantly hydrophobic.

Physical state

Liquid

Viscosity

- Kinematic viscosity: 1,6 mm²/s 40 °C
- Dynamic viscosity: Not available.

Amounts used

- Fraction of EU tonnage used in region: 0,1
- Regional use tonnage (tons/year): 5,2 e6
- Fraction of Regional tonnage used locally: 0,0058
- Annual site tonnage (tons/year): 3 e4
- Maximum daily site tonnage (kg/day): 1 e5

Frequency and duration of use

- Batch process: Not available.
- Continuous process: Emission days (days/year): 300

Environment factors not influenced by risk management

- Local freshwater dilution factor: 10
- Local marine water dilution factor: 100

Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Type</th>
<th>Emission days (days/year)</th>
<th>Air</th>
<th>Emission factors</th>
<th>Water</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>initial release prior to RMM</td>
<td>300</td>
<td>0,01</td>
<td>0,0002</td>
<td>0,0001</td>
<td></td>
</tr>
</tbody>
</table>

Kerosene - All Grades (Refer to Synonyms for Product Name)
Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

<table>
<thead>
<tr>
<th>Component</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Treat air emission to provide a typical removal efficiency of (%) 0</td>
</tr>
<tr>
<td>Soil</td>
<td>Not available.</td>
</tr>
<tr>
<td>Water</td>
<td>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 86,0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0</td>
</tr>
<tr>
<td>Sediment</td>
<td>Not available.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.</td>
</tr>
</tbody>
</table>

Organisational measures to prevent/limit release from site

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

<table>
<thead>
<tr>
<th>Size of municipal sewage system/treatment plant (m3/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Discharge rate</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
</tr>
<tr>
<td>Sludge treatment technique</td>
</tr>
<tr>
<td>Measures to limit air emissions</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</td>
</tr>
</tbody>
</table>

Conditions and measures related to external treatment of waste for disposal

<table>
<thead>
<tr>
<th>Fraction of used amount transferred to external waste treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable waste treatment</td>
</tr>
<tr>
<td>Disposal methods</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
</tbody>
</table>

Conditions and measures related to external recovery of waste

<table>
<thead>
<tr>
<th>Fraction of used amount transferred to external waste treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable recover operations</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
</tbody>
</table>

Additional good practice advice beyond the REACH CSA

Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.
2.2. Contributing exposure scenario controlling worker exposure for Use in closed process, no likelihood of exposure.

Process categories beyond the REACH CSA
- Use in closed, continuous process with occasional controlled exposure.
- Use in closed batch process (synthesis or formulation).
- Use in batch and other process (synthesis) where opportunity for exposure arises.
- Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
- Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
- Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
- Use as laboratory reagent.

Product characteristics
- Concentration of the substance in a mixture: Covers percentage substance in the product up to 100 % (unless stated differently).
- Physical form of the product: Liquid
- Vapour pressure: Liquid, vapour pressure 0,5 - 10 kPa at STP.
- Process temperature: Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Amounts used
- Not available.

Frequency and duration of use
- Covers daily exposures up to 8 hours (unless stated differently).

Duration | Frequency of use | Remarks
--- | --- | ---
8 hours | 1 hours per day | Assumes a good basic standard of occupational hygiene is implemented.

Human factors not influenced by risk management

Exposed skin areas
- Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Other given operational conditions affecting workers exposure

Area of use | Room size | Temperature | Ventilation rate | Remarks
--- | --- | --- | --- | ---

Other relevant operational conditions
- Not available.

Risk management measures (RMM)
- Technical conditions and measures at process level (source) to prevent release: Not available.
- Technical conditions and measures to control dispersion from source towards the worker: Not available.
- Organizational measures to prevent/limit releases, dispersion and exposure: Not available.
- Conditions and measures related to personal protection, hygiene and health evaluations: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

3. Exposure Estimation

Environment
- See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

Health

<table>
<thead>
<tr>
<th>Exposure level</th>
<th>RCR</th>
<th>Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>General exposures (closed systems)</td>
<td>0,01 ppm</td>
<td>0</td>
<td>**</td>
</tr>
<tr>
<td>General exposures (closed systems)</td>
<td>10 ppm</td>
<td>0,250</td>
<td>**</td>
</tr>
</tbody>
</table>
General exposures (closed systems) 25 ppm 0.625 ** Inhalation Exposure
General exposures (open systems) 20 ppm 0.500 ** Inhalation Exposure
Process sampling 25 ppm 0.625 ** Inhalation Exposure
Laboratory activities 10 ppm 0.250 ** Inhalation Exposure
Bulk transfers 5 ppm 0.125 ** Inhalation Exposure
Mixing operations (open systems) 50 ppm 0.125 ** Inhalation Exposure
Manual / Transfer from/pouring from containers. 50 ppm 0.125 ** Inhalation Exposure
Drum/batch transfers 50 ppm 0.38 ** Inhalation Exposure
Production of preparations or articles by tabletting, compression, extrusion, pelletisation 50 ppm 0.125 ** Inhalation Exposure
Drum and small package filling 50 ppm 0.125 ** Inhalation Exposure
Equipment cleaning and maintenance 50 ppm 0.250 ** Inhalation Exposure
Bulk product storage 10 ppm 0.250 ** Inhalation Exposure

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Health

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.

Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
1. Manufacture of substances

List of use descriptors

Sector(s) of Use

SU3: Industrial uses.
SU8: Manufacture of bulk, large scale chemicals (including petroleum products).
SU9: Manufacture of fine chemicals.

Product categories [PC]:
Not available.

Name of contributing environmental scenario and corresponding ERC

ERC1: Manufacture of substances.
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles.
Specific Environmental Release Category: ESVOC SpERC 1.1.v1

List of names of contributing worker scenarios and corresponding PROCs

PROC1: Use in closed process, no likelihood of exposure.
PROC2: Use in closed, continuous process with occasional controlled exposure.
PROC3: Use in closed batch process (synthesis or formulation).
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises.
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
PROC15: Use as laboratory reagent.

Further explanations

Other Process or activity

Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).


Product characteristics

Concentration of the substance in a mixture
Covers percentage substance in the product up to 100 % (unless stated differently).

Substance is complex UVCB. Predominantly hydrophobic.

Physical state

Liquid

Viscosity

Kinematic viscosity
1,6 mm²/s 40 °C

Dynamic viscosity
Not available.

Amounts used

Fraction of EU tonnage used in region:
0,1

Regional use tonnage (tons/year):
5,4 e6

Fraction of Regional tonnage used locally:
0,11

Annual site tonnage (tons/year):
6 e5

Maximum daily site tonnage (kg/day):
2 e6

Frequency and duration of use

Batch process
Not available.

Continuous process
Emission days (days/year): 300

Environment factors not influenced by risk management

Local freshwater dilution factor:
10

Local marine water dilution factor:
100

Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Type</th>
<th>Emission days (days/year)</th>
<th>Air</th>
<th>Emission factors</th>
<th>Soil</th>
<th>Water</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>initial release</td>
<td>300</td>
<td>0,01</td>
<td>0,0001</td>
<td>0,0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>prior to RMM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

**Air**
Treat air emission to provide a typical removal efficiency of (%): 90

**Soil**
Not available.

**Water**
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 97,7. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 56,1

**Sediment**
Not available.

**Remarks**
Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. Onsite wastewater treatment required.

Organisational measures to prevent/limit release from site
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

**Size of municipal sewage system/treatment plant (m3/d)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Municipal STP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge rate</td>
<td>10000</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
<td>94,7</td>
</tr>
<tr>
<td>Sludge treatment technique</td>
<td>Not available.</td>
</tr>
<tr>
<td>Measures to limit air emissions</td>
<td>Not available.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 2,0e6</td>
</tr>
<tr>
<td>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</td>
<td>97,7</td>
</tr>
</tbody>
</table>

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

| Suitable waste treatment | Not available. |
| Disposal methods         | Not available. |
| Treatment effectiveness  | Not available. |
| Remarks                  | During manufacturing no waste of the substance is generated. |

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

| Suitable recover operations | During manufacturing no waste of the substance is generated to recover. |
| Treatment effectiveness     | Not available. |
| Remarks                      | Not available. |

Additional good practice advice beyond the REACH CSA

Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in the PETRORISK file.

2.2. Contributing exposure scenario controlling worker exposure for Use in closed process, no likelihood of exposure.

**Process categories beyond the REACH CSA**
Use in closed, continuous process with occasional controlled exposure.
Use in closed batch process (synthesis or formulation).
Use in batch and other process (synthesis) where opportunity for exposure arises.
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use as laboratory reagent.

**Product characteristics**

| Concentration of the substance in a mixture | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Physical form of the product | Liquid |
| Vapour pressure | Liquid, vapour pressure 0,5 - 10 kPa at STP. |
| Process temperature | Operation is carried out at elevated temperature (> 20°C above ambient temperature). |
Amounts used
Not available.

Frequency and duration of use
Not available.

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure
Not available.

Other relevant operational conditions
Not available.

Risk management measures (RMM)
Technical conditions and measures at process level (source) to prevent release
Not available.

Technical conditions and measures to control dispersion from source towards the worker
Not available.

Organizational measures to prevent/limit releases, dispersion and exposure
General measures (skin irritants):
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. wash off any skin contamination immediately. provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluations
Not available.

3. Exposure Estimation

Environment
Not available.

Health

<table>
<thead>
<tr>
<th>Exposure level</th>
<th>RCR</th>
<th>Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>General exposures (closed systems)</td>
<td>0.01 ppm</td>
<td>0</td>
<td>**</td>
</tr>
<tr>
<td>General exposures (closed system) + With sample collection</td>
<td>10 ppm</td>
<td>0.250</td>
<td>**</td>
</tr>
<tr>
<td>General exposures (closed systems)</td>
<td>25 ppm</td>
<td>0.625</td>
<td>**</td>
</tr>
<tr>
<td>General exposures (open systems)</td>
<td>20 ppm</td>
<td>0.500</td>
<td>**</td>
</tr>
<tr>
<td>Bulk transfers</td>
<td>5 ppm</td>
<td>0.125</td>
<td>**</td>
</tr>
<tr>
<td>Sample collection</td>
<td>25 ppm</td>
<td>0.625</td>
<td>**</td>
</tr>
<tr>
<td>Laboratory activities</td>
<td>10 ppm</td>
<td>0.250</td>
<td>**</td>
</tr>
<tr>
<td>Clean down and Maintenance</td>
<td>50 ppm</td>
<td>0.250</td>
<td>**</td>
</tr>
<tr>
<td>Storage</td>
<td>10 ppm</td>
<td>0.250</td>
<td>**</td>
</tr>
</tbody>
</table>
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Health

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.

Available hazard data do not support the need for a DNEL to be established for other health effects. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
1. Use as a fuel

List of use descriptors

- **Sector(s) of Use**: SU3: Industrial uses.
- **Product categories [PC]**: Not available.

Name of contributing environmental scenario and corresponding ERC

- **ERC7**: Industrial use of substances in closed systems. Specific Environmental Release Category: ESVOC SpERC 7.12a.v1

List of names of contributing worker scenarios and corresponding PROCs

- **PROC1**: Use in closed process, no likelihood of exposure.
- **PROC2**: Use in closed, continuous process with occasional controlled exposure.
- **PROC3**: Use in closed batch process (synthesis or formulation).
- **PROC8a**: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
- **PROC8b**: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
- **PROC16**: Using material as fuel sources, limited exposure to unburned product to be expected.

Further explanations

- **Other Process or activity**: Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.

2.1. Contributing exposure scenario controlling environmental exposure for Industrial use of substances in closed systems.

Product characteristics

- **Concentration of the substance in a mixture**: Covers percentage substance in the product up to 100 % (unless stated differently). Substance is complex UVCB. Predominantly hydrophobic.
- **Physical state**: Liquid
- **Viscosity**
  - **Kinematic viscosity**: 1,6 mm²/s 40 °C
  - **Dynamic viscosity**: Not available.

Amounts used

- **Fraction of EU tonnage used in region**: 0,1
- **Regional use tonnage (tons/year)**: 5,5 e5
- **Fraction of Regional tonnage used locally**: 1
- **Annual site tonnage (tons/year)**: 5,5 e5
- **Maximum daily site tonnage (kg/day)**: 1,8 e6

Frequency and duration of use

- **Batch process**: Not available.
- **Continuous process**: Emission days (days/year): 300

Environment factors not influenced by risk management

- **Local freshwater dilution factor**: 10
- **Local marine water dilution factor**: 100

Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Type</th>
<th>Emission days (days/year)</th>
<th>Air</th>
<th>Emission factors</th>
<th>Water</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial release prior to RMM</td>
<td>300</td>
<td>0,005</td>
<td>0</td>
<td>0,00001</td>
<td></td>
</tr>
</tbody>
</table>

Risk management measures (RMM)

- **Technical conditions and measures at process level (source) to prevent release**: Common practices vary across sites thus conservative process release estimates used.

- **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**
  - **Air**: Treat air emission to provide a typical removal efficiency of (%): 95
  - **Soil**: Not available.
Water

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 84,6. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0

Sediment

Not available.

Remarks

Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Organisational measures to prevent/limit release from site

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d)

Type Municipal STP

Discharge rate 2000

Treatment effectiveness 94,7

Sludge treatment technique Not available.

Measures to limit air emissions Not available.

Remarks Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): 5,3e6

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%) 94,7

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment Not available.

Disposal methods Not available.

Treatment effectiveness Not available.

Remarks Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations

This substance is consumed during use and no waste of the substance is generated.

Treatment effectiveness Not available.

Remarks Not available.

Additional good practice advice beyond the REACH CSA

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in the PETRORISK file.

2.2. Contributing exposure scenario controlling worker exposure for Use in closed process, no likelihood of exposure.

Process categories beyond the REACH CSA

Use in closed, continuous process with occasional controlled exposure. Use in closed batch process (synthesis or formulation). Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Using material as fuel sources, limited exposure to unburned product to be expected.

Product characteristics

Concentration of the substance in a mixture Covers percentage substance in the product up to 100 % (unless stated differently).

Physical form of the product Liquid

Vapour pressure Liquid, vapour pressure 0,5 - 10 kPa at STP.

Process temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Amounts used

Not available.
### Frequency and duration of use

<table>
<thead>
<tr>
<th>Duration</th>
<th>Frequency of use</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hours</td>
<td>1 hour per day</td>
<td>Assumes a good basic standard of occupational hygiene is implemented.</td>
</tr>
</tbody>
</table>

### Human factors not influenced by risk management

### Exposed skin areas

- Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

### Other given operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Area of use</th>
<th>Room size</th>
<th>Temperature</th>
<th>Ventilation rate</th>
<th>Remarks</th>
</tr>
</thead>
</table>

### Other relevant operational conditions

Not available.

### Risk management measures (RMM)

- Technical conditions and measures at process level (source) to prevent release: Not available.
- Technical conditions and measures to control dispersion from source towards the worker: Not available.
- Organizational measures to prevent/limit releases, dispersion and exposure: Not available.
- Conditions and measures related to personal protection, hygiene and health evaluations:
  - Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

### 3. Exposure Estimation

#### Environment

See PETRORISK file in IUCLID Section 13 - "LocalCSR" worksheet.

#### Health

<table>
<thead>
<tr>
<th>Exposure level</th>
<th>RCR</th>
<th>Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>General exposures (closed systems) 10 ppm</td>
<td>0.250</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>General exposures (closed systems) 25 ppm</td>
<td>0.625</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Transport 5 ppm</td>
<td>0.125</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Bulk transfers 50 ppm</td>
<td>0.875</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Drum/batch transfers 50 ppm</td>
<td>0.875</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Equipment cleaning and maintenance 50 ppm</td>
<td>0.250</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Vessel and container cleaning 50 ppm</td>
<td>0.125</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
<tr>
<td>Bulk product storage 10 ppm</td>
<td>0.250</td>
<td>**</td>
<td>Inhalation Exposure</td>
</tr>
</tbody>
</table>

** - The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

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