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

Product information

Product Name: Scentinel® E Gas Odorant
Material: 1106808, 1086435, 1086434, 1095112, 1079767, 1064505, 1098464, 1098226, 1024677, 1024673, 1034741, 1024674, 1024676, 1024678, 1024780, 1024782, 1024781, 1024778, 1024783, 1036153, 1024780, 1024782, 1024781, 1024778, 1024783, 1036153, 1024779, 1024675, 1105014

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No. Registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butyl Mercaptan</td>
<td>75-66-1</td>
<td>Chevron Phillips Chemicals International NV 01-2119491288-26-0000</td>
</tr>
<tr>
<td></td>
<td>200-890-2</td>
<td></td>
</tr>
<tr>
<td>Isopropyl Mercaptan</td>
<td>75-33-2</td>
<td>Chevron Phillips Chemicals International NV Pre-Registered</td>
</tr>
<tr>
<td></td>
<td>200-861-4</td>
<td></td>
</tr>
<tr>
<td>n-Propyl Mercaptan</td>
<td>107-03-9</td>
<td>Chevron Phillips Chemicals International NV Pre-Registered</td>
</tr>
<tr>
<td></td>
<td>203-455-5</td>
<td></td>
</tr>
</tbody>
</table>

Relevant Identified Uses

Supported: Manufacture, Distribution, Formulation, Use as an intermediate, Injection as odorant in fuels – industrial

Company

Chevron Phillips Chemical Company LP
Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Local

Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vinci laan 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Flammable liquids, Category 2</th>
<th>H225:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Number:100000013401</td>
<td>2/27</td>
</tr>
</tbody>
</table>
Scentinel® E Gas Odorant

Version 3.0  Revision Date 2018-04-02

Skin sensitization, Sub-category 1B  H317:
Acute aquatic toxicity, Category 1  H400:
Chronic aquatic toxicity, Category 2  H411:

Highly flammable liquid and vapor.  May cause an allergic skin reaction.  Very toxic to aquatic life.  Toxic to aquatic life with long lasting effects.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms  
![Hazard pictograms]

Signal Word : Danger

Hazard Statements :  
H225  Highly flammable liquid and vapor.  
H317  May cause an allergic skin reaction.  
H400  Very toxic to aquatic life.  
H411  Toxic to aquatic life with long lasting effects.

Precautionary Statements  

Prevention:  
P210  Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P233  Keep container tightly closed.  
P240  Ground/bond container and receiving equipment.  
P243  Take precautionary measures against static discharge.  
P273  Avoid release to the environment.  
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:  
P303 + P361 + P353  IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.

Storage:  
P403 + P235  Store in a well-ventilated place. Keep cool.

Hazardous ingredients which must be listed on the label:
- 75-66-1  t-Butyl Mercaptan

Additional Labeling:

The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 1 %
The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 1 %

SECTION 3: Composition/information on ingredients

Synonyms : Mercaptan Mixture  
Gas Odorant  

SDS Number:100000013401  3/27
Molecular formula : Mixture

Mixtures

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No. EC-No.</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butyl Mercaptan</td>
<td>75-66-1 200-890-2</td>
<td>Flam. Liq.; H225, Aquatic Acute 2; H401, Skin Sens. 1; H317, Aquatic Chronic 2; H411</td>
<td>75 - 80</td>
</tr>
<tr>
<td>Isopropyl Mercaptan</td>
<td>75-33-2 200-861-4</td>
<td>Flam. Liq.; H225, Skin Sens. 1B; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410</td>
<td>13 - 18</td>
</tr>
<tr>
<td>n-Propyl Mercaptan</td>
<td>107-03-9 203-455-5</td>
<td>Flam. Liq.; H225, Acute Tox. 4; H302, Skin Sens. 1B; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410</td>
<td>3 - 8</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.

If inhaled : Move to fresh air. If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point : -18 ºC (0 ºF) estimated

Autoignition temperature : 200 ºC (392 ºF)
Suitable extinguishing media: Dry chemical. Carbon dioxide (CO2). Alcohol-resistant foam.

Unsuitable extinguishing media: High volume water jet.

Specific hazards during fire fighting: Do not allow run-off from fire fighting to enter drains or water courses.

Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for firefighting if necessary.

Further information: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.

Fire and explosion protection: Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.

Hazardous decomposition products: Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions: Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up: Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

For additional details, see the Exposure Scenario in the Annex portion.

SECTION 7: Handling and storage

Handling

Advice on safe handling: Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or
exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

Advice on protection against fire and explosion: Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.

Storage
Requirements for storage areas and containers: No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Chevron Phillips Chemical Company LP

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butyl Mercaptan</td>
<td>Manufacturer</td>
<td>TWA</td>
<td>0.5 ppm,</td>
<td></td>
</tr>
</tbody>
</table>

Engineering measures
Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection: Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection: The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the
contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate.: Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

Hygiene measures : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

## SECTION 9: Physical and chemical properties

### Information on basic physical and chemical properties

#### Appearance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Repulsive</td>
</tr>
</tbody>
</table>

#### Safety data

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>-18 °C (0 °F) estimated</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>1,4 % (V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>12,5 % (V)</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>no</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>200 °C (392 °F)</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>Mixture</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Pour point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>57 - 60 °C (135 - 140 °F)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>48,00 kPa at 38 °C (100 °F)</td>
</tr>
<tr>
<td>Relative density</td>
<td>0,81 at 16 °C (61 °F)</td>
</tr>
</tbody>
</table>
### SAFETY DATA SHEET

**Scentinel® E Gas Odorant**

**Version 3.0**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water solubility</td>
<td>Negligible</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>2 (Air = 1.0)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&gt; 1 (N-Butyl Acetate = 1)</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>&gt; 99 %</td>
</tr>
</tbody>
</table>

#### SECTION 10: Stability and reactivity

**Chemical stability**: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Possibility of hazardous reactions**

- **Conditions to avoid**: Not applicable.
- **Materials to avoid**: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Thermal decomposition**: No data available

**Hazardous decomposition products**

- Carbon oxides
- Sulfur oxides

**Other data**: No decomposition if stored and applied as directed.

#### SECTION 11: Toxicological information

**Scentinel® E Gas Odorant**

**Acute oral toxicity**

- LD50: > 5,000 mg/kg
- Method: Acute toxicity estimate

**Acute inhalation toxicity**

- t-Butyl Mercaptan
  - LC50: 26643 ppm
  - Exposure time: 4 h
  - Species: Rat
  - Sex: male and female
  - Test atmosphere: vapor
  - Method: OECD Test Guideline 403

- LC50: 22200 ppm
  - Exposure time: 4 h
  - Species: Rat

**SDS Number**: 100000013401
Sex: male  
Test atmosphere: vapor  
Method: OECD Test Guideline 403  

LC50: 16500 ppm  
Exposure time: 4 h  
Species: Mouse  
Sex: male  
Test atmosphere: vapor  
Method: OECD Test Guideline 403  

Isopropyl Mercaptan  
LC50: > 32.24 mg/l  
Exposure time: 4 h  
Species: Rat  
Sex: male and female  
Test atmosphere: vapor  
Method: OECD Test Guideline 403  
Test substance: yes  
An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Acute dermal toxicity  
Isopropyl Mercaptan  
LD50: > 2.000 mg/kg  
Species: Rat  

Scentinel® E Gas Odorant  
Skin irritation: May cause skin irritation and/or dermatitis.  

Eye irritation: May cause irreversible eye damage.  

Sensitization: Causes sensitization.  

Repeated dose toxicity  
t-Butyl Mercaptan  
Species: Rat, Male and female  
Sex: Male and female  
Application Route: Inhalation  
Dose: 9, 97, 196 ppm  
Exposure time: 13 wks  
Number of exposures: 6 hrs/d, 5 d/wk  
NOEL: > 196 ppm
Scentinel® E Gas Odorant

Species: Rat, Male and female
Sex: Male and female
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg bw/day
Exposure time: 42-53 days
Number of exposures: Daily
NOEL: 50 mg/kg bw/day
Lowest observable effect level: 200 mg/kg bw/day
Method: OECD Guideline 422

Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 25.1, 99.6, 403.4 ppm
Exposure time: 13 wks
Number of exposures: 6 hrs/d, 5 d/wk
NOEL: 99.6 ppm
Lowest observable effect level: 403.4 ppm
Method: OECD Guideline 413
Target Organs: Liver, Kidney, Blood, Upper respiratory tract
Information given is based on data obtained from similar substances.

Reproductive toxicity

t-Butyl Mercaptan

Species: Rat
Sex: Male and female
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg bw/day
Number of exposures: Daily
Test period: 42-53 days
Method: OECD Guideline 422
NOAEL Parent: 200 mg/kg bw/day
NOAEL F1: 50 mg/kg bw/day
No adverse effects expected

Developmental Toxicity

t-Butyl Mercaptan

Species: Mouse
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: GD 6-16
Number of exposures: 6 hrs/d
NOAEL Teratogenicity: > = 195 ppm
NOAEL Maternal: > = 195 ppm
Species: Rat
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: GD6-19
Number of exposures: 6 hrs/d
NOAEL Teratogenicity: > =195 ppm
NOAEL Maternal: >= 195 ppm

Species: Rat
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg bw/day
Exposure time: 42-53 days
Number of exposures: Daily
NOAEL Teratogenicity: 50 mg/kg bw /day
NOAEL Maternal: 200 mg/kg bw /day

**Aspiration toxicity**
May be harmful if swallowed and enters airways. Substances known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity hazard.

**CMR effects**
t-Butyl Mercaptan: Carcinogenicity: Not available
Mutagenicity: Did not show mutagenic effects in animal experiments.
Teratogenicity: Did not show teratogenic effects in animal experiments.
Reproductive toxicity: No toxicity to reproduction

**Further information**
Concentrations substantially above the TLV value may cause narcotic effects. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Solvents may degrease the skin.

### SECTION 12: Ecological information

**Toxicity to fish**
t-Butyl Mercaptan: LC50: 34 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
semi-static test Method: OECD Test Guideline 203

Isopropyl Mercaptan: LC50: 34 mg/l
Exposure time: 96 h
semi-static test Analytical monitoring: yes
Method: OECD Test Guideline 203
Information given is based on data obtained from similar substances.

n-Propyl Mercaptan: LC50: 1.3 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)
Analytical monitoring: yes
Test substance: yes  
Method: OECD Test Guideline 203  
Toxic to aquatic organisms.

### Toxicity to daphnia and other aquatic invertebrates

**t-Butyl Mercaptan**  
EC50: 6,7 mg/l  
Exposure time: 48 h  
Species: Daphnia magna (Water flea)  
static test  
Method: OECD Test Guideline 202

**Isopropyl Mercaptan**  
EC50: 0,25 - 0,5 mg/l  
Exposure time: 48 h  
Species: Daphnia magna (Water flea)  
Methods: yes  
Method: OECD Test Guideline 202

**n-Propyl Mercaptan**  
EC50: 0,07 mg/l  
Exposure time: 48 h  
Species: Daphnia magna (Water flea)  
Test substance: yes  
Method: OECD Test Guideline 202  
Very toxic to aquatic organisms.

### Toxicity to algae

**t-Butyl Mercaptan**  
EC50: 24 mg/l  
Exposure time: 72 h  
Species: Pseudokirchneriella subcapitata (green algae)  
Method: OECD Test Guideline 201

**Isopropyl Mercaptan**  
ErC50: 21,9 mg/l  
Exposure time: 72 h  
Species: Pseudokirchneriella subcapitata (green algae)  
static test  
Method: OECD Test Guideline 201

### M-Factor

<table>
<thead>
<tr>
<th>Compound</th>
<th>M-Factor (Acute Aquat. Tox.)</th>
<th>M-Factor (Chron. Aquat. Tox.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>propane-2-thiol</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>propane-1-thiol</td>
<td>M-Factor (Acute Aquat. Tox.)</td>
<td>10</td>
</tr>
</tbody>
</table>

### Elimination information (persistence and degradability)

**Bioaccumulation**

**t-Butyl Mercaptan**:  
Bioconcentration factor (BCF): 12  
Bioaccumulation is unlikely.

**Biodegradability**:  
Expected to be biodegradable
Ecotoxicology Assessment

Acute aquatic toxicity
- t-Butyl Mercaptan: Toxic to aquatic life.
- Isopropyl Mercaptan: Very toxic to aquatic life.
- n-Propyl Mercaptan: Very toxic to aquatic life.

Chronic aquatic toxicity
- t-Butyl Mercaptan: Toxic to aquatic life with long lasting effects.
- Isopropyl Mercaptan: Very toxic to aquatic life with long lasting effects.
- n-Propyl Mercaptan: Very toxic to aquatic life with long lasting effects.

Results of PBT assessment
- t-Butyl Mercaptan: Non-classified PBT substance, Non-classified vPvB substance
- Isopropyl Mercaptan: Non-classified PBT substance, Non-classified vPvB substance

Additional ecological information: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life., Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped. Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product: The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Contaminated packaging: Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the...
bill of lading.

**US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, (-18 °C), MARINE POLLUTANT, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, ENVIRONMENTALLY HAZARDOUS, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, ENVIRONMENTALLY HAZARDOUS

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

**SECTION 15: Regulatory information**

<table>
<thead>
<tr>
<th>National legislation</th>
<th>Chemical Safety Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredients</td>
<td>2-methylpropane-2-thiol</td>
</tr>
<tr>
<td>A Chemical Safety Assessment has been carried out for this substance.</td>
<td></td>
</tr>
<tr>
<td>Major Accident Hazard Legislation</td>
<td>96/82/EC Update: 2003</td>
</tr>
<tr>
<td>Highly flammable</td>
<td></td>
</tr>
<tr>
<td>7b</td>
<td></td>
</tr>
<tr>
<td>Quantity 1: 5.000 t</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000013401 14/27
Scentinel® E Gas Odorant

Version 3.0

Revision Date 2018-04-02

Quantity 2: 50,000 t

Water contaminating class (Germany): WGK 3 highly water endangering

Notification status:
- Europe REACH: On the inventory, or in compliance with the inventory
- United States of America (USA) TSCA: On the inventory, or in compliance with the inventory
- Canada DSL: On the inventory, or in compliance with the inventory
- Australia AICS: On the inventory, or in compliance with the inventory
- New Zealand NZIoC: On the inventory, or in compliance with the inventory
- Japan ENCS: On the inventory, or in compliance with the inventory
- Korea KECI: On the inventory, or in compliance with the inventory
- Philippines PICCS: On the inventory, or in compliance with the inventory
- China IECSC: On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification:
- Health Hazard: 2
- Fire Hazard: 3
- Reactivity Hazard: 0

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

<table>
<thead>
<tr>
<th>Key or legend to abbreviations and acronyms used in the safety data sheet</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Government Industrial Hygienists</td>
</tr>
<tr>
<td>LD50</td>
<td>Lethal Dose 50%</td>
</tr>
<tr>
<td>AICS</td>
<td>Australia, Inventory of Chemical Substances</td>
</tr>
<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>DSL</td>
<td>Canada, Domestic Substances List</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Agency</td>
</tr>
<tr>
<td>NDSL</td>
<td>Canada, Non-Domestic Substances List</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service</td>
</tr>
<tr>
<td>NZIoC</td>
<td>New Zealand Inventory of Chemicals</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration</td>
</tr>
<tr>
<td>NOAEL</td>
<td>No Observable Adverse Effect</td>
</tr>
</tbody>
</table>

SDS Number: 100000013401
SAFETY DATA SHEET

Scentinel® E Gas Odorant

Version 3.0

Revision Date 2018-04-02

<table>
<thead>
<tr>
<th>EC50</th>
<th>Effective Concentration 50%</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Chemical Substances</td>
<td>EOSCA Generic Exposure Scenario Tool</td>
</tr>
<tr>
<td>EOSCA</td>
<td>European Oilfield Specialty Chemicals Association</td>
<td>PEL</td>
</tr>
<tr>
<td>GHS</td>
<td>Globally Harmonized System</td>
<td>RCRA</td>
</tr>
<tr>
<td>IC50</td>
<td>Inhibition Concentration 50%</td>
<td>SARA</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
<td>TLV</td>
</tr>
<tr>
<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
<td>TWA</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
<td>TSCA</td>
</tr>
<tr>
<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
<td>UVCB</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
<td>WHMIS</td>
</tr>
</tbody>
</table>

Full text of H-Statements referred to under sections 2 and 3.

H225 Highly flammable liquid and vapor.
H302 Harmful if swallowed.
H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.
H401 Toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.
H411 Toxic to aquatic life with long lasting effects.

SDS Number:100000013401 16/27
### Annex

**1. Short title of Exposure Scenario:** Manufacture

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector of use</td>
<td>SU3, SU8, SU9: Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals</td>
</tr>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td>PROC3: Use in closed batch process (synthesis or formulation)</td>
</tr>
<tr>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles</td>
</tr>
<tr>
<td>Further information</td>
<td>Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities</td>
</tr>
</tbody>
</table>

### 2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

#### Product characteristics

- **Viscosity, dynamic:** 1.6 mPa.s at 20 °C

#### Environment factors not influenced by risk management

- **Flow rate:** 18,000 m3/d
- **Dilution Factor (River):** 10
- **Dilution Factor (Coastal Areas):** 100

#### Other given operational conditions affecting environmental exposure

- **Number of emission days per year:** 365
- **Emission or Release Factor: Water:** 0 %
- **Emission or Release Factor: Soil:** 0.01 %
- **Remarks:** Emission or Release Factor: Air: < 0.001 %

#### Technical conditions and measures / Organizational measures

- **Air:** Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99.9 %)
- **Remarks:** Wastewater emission controls are not applicable as there is no direct release to wastewater.
- **Remarks:** Prevent environmental discharge consistent with regulatory requirements.
SAFETY DATA SHEET

Scentinel® E Gas Odorant

Version 3.0  
Revision Date 2018-04-02

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent: 2,000 m³/d
Remarks: Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal
Waste treatment: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste
Recovery Methods: External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Use as laboratory reagent

Organizational measures to prevent/limit releases, dispersion and exposure
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 evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC1, ERC4</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.413 ng/L</td>
<td>0.000062</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0348 ng/L</td>
<td>0.000052</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>1.7 ng/kg</td>
<td>0.000146</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.143 ng/kg</td>
<td>0.000123</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>0.514 ng/kg</td>
<td>0.000074</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC1: Manufacture of substances
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

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

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: Distribution

SDS Number: 100000013401 18/27
**Scentinel® E Gas Odorant**

**Main User Groups**: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

**Sector of use**: SU3: Industrial Manufacturing (all)

**Process category**:
- **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

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

**Further information**:
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, distribution and associated laboratory activities.

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

**Product characteristics**
- **Viscosity, dynamic**: 1.6 mPa.s at 20 °C

**Environment factors not influenced by risk management**
- **Flow rate**: 18,000 m3/d
- **Dilution Factor (River)**: 10
- **Dilution Factor (Coastal Areas)**: 100
SAFETY DATA SHEET

Scentinel® E Gas Odorant

Version 3.0

Revision Date 2018-04-02

Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Number of emission days per year</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission or Release Factor: Air</td>
<td>0.01 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
<td>0.001 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
<td>0.001 %</td>
</tr>
</tbody>
</table>

Technical conditions and measures / Organizational measures

Air
- Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99.9 %)

Water
- Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99.9 %)

Remarks
- Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent
- 2.000 m³/d

Remarks
- Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment
- External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods
- External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15:
- Use in closed process, no likelihood of exposure.
- Use in closed, continuous process with occasional controlled exposure.
- Use in 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.

Organizational measures to prevent /limit releases, dispersion and exposure

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 evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Number: 100000013401</td>
<td>20/27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7

<table>
<thead>
<tr>
<th>ERC1: Manufacture of substances</th>
<th>ERC2: Formulation of preparations</th>
<th>ERC3: Formulation in materials</th>
<th>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</th>
<th>ERC5: Industrial use resulting in inclusion into or onto a matrix</th>
<th>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</th>
<th>ERC6b: Industrial use of reactive processing aids</th>
<th>ERC6c: Industrial use of monomers for manufacture of thermoplastics</th>
<th>ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers</th>
<th>ERC7: Industrial use of substances in closed systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EUSES</strong></td>
<td><strong>Freshwater</strong></td>
<td><strong>Marine water</strong></td>
<td><strong>0.107 µg/L</strong></td>
<td><strong>0.016 µg/kg</strong></td>
<td><strong>0.10 µg/L</strong></td>
<td><strong>0.149 µg/kg</strong></td>
<td><strong>0.44 µg/kg</strong></td>
<td><strong>0.0379 µg/kg</strong></td>
<td><strong>0.411 µg/kg</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Freshwater sediment</strong></td>
<td></td>
<td></td>
<td><strong>0.10 µg/L</strong></td>
<td><strong>0.016 µg/kg</strong></td>
<td><strong>0.10 µg/L</strong></td>
<td><strong>0.149 µg/kg</strong></td>
<td><strong>0.44 µg/kg</strong></td>
<td><strong>0.0379 µg/kg</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Marine sediment</strong></td>
<td></td>
<td><strong>0.44 µg/kg</strong></td>
<td><strong>0.0379 µg/kg</strong></td>
<td><strong>0.411 µg/kg</strong></td>
<td><strong>0.354 µg/kg</strong></td>
<td></td>
<td></td>
<td><strong>0.354 µg/kg</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Soil</strong></td>
<td></td>
<td><strong>1.63 µg/kg</strong></td>
<td><strong>0.236 µg/kg</strong></td>
<td><strong>1.63 µg/kg</strong></td>
<td><strong>0.236 µg/kg</strong></td>
<td></td>
<td></td>
<td><strong>1.63 µg/kg</strong></td>
</tr>
</tbody>
</table>

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

#### 1. Short title of Exposure Scenario: **Formulation**

- **Main User Groups**: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
- **Sector of use**: SU3, SU 10: Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
- **Process category**: 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
- PROC 5: 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
- **PROC15**: Use as laboratory reagent
- **Environmental release category**: ERC2: Formulation of preparations
Further information: Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

Product characteristics
Viscosity, dynamic: 1.6 mPa.s at 20 °C

Environment factors not influenced by risk management
Flow rate: 18,000 m3/d
Dilution Factor (River): 10
Dilution Factor (Coastal Areas): 100

Other given operational conditions affecting environmental exposure
Number of emission days per year: 365
Emission or Release Factor: Air: 0.25 %
Emission or Release Factor: Water: 0.001 %
Emission or Release Factor: Soil: 0.01 %

Technical conditions and measures / Organizational measures
Air: Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99.8 %)
Water: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Effectiveness: 99.9 %)
Remarks: Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent: 2,000 m3/d
Remarks: Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal
Waste treatment: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste
Recovery Methods: External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15: Use in closed process, no likelihood of exposure, 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 mixtures and articles (multistage and/or significant contact) Industrial setting;, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or...
Scentinel® E Gas Odorant

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

Organizational measures to prevent/limit releases, dispersion and exposure
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 evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>ERC2</th>
<th>EUSES</th>
<th>Freshwater</th>
<th>0.0395 µg/L</th>
<th>0.00589</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0367 µg/L</td>
<td>0.0548</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.162 µg/kg</td>
<td>0.0140</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.151 µg/kg</td>
<td>0.130</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>1.71 µg/kg</td>
<td>0.248</td>
</tr>
</tbody>
</table>

ERC2: Formulation of preparations

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

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: Use as an intermediate

Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use : SU3, SU8, SU9: Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category : 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
## 2.1 Contributing scenario controlling environmental exposure for: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

### Product characteristics

**Viscosity, dynamic**: 1.6 mPa.s at 20 °C

### Environment factors not influenced by risk management

**Flow rate**: 18,000 m³/d  
**Dilution Factor (River)**: 10  
**Dilution Factor (Coastal Areas)**: 100

### Other given operational conditions affecting environmental exposure

**Number of emission days per year**: 300  
**Emission or Release Factor: Air**: 0.5 %  
**Emission or Release Factor: Water**: 1.0 %  
**Emission or Release Factor: Soil**: 0.1 %

### Technical conditions and measures / Organizational measures

**Air**: Treat air emission to provide the required removal efficiency of (%)**: (Effectiveness: > 99.5 %)

**Water**: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%)**: (Effectiveness: 99 %)

**Remarks**: Negligible wastewater emissions as process operates without water contact.

### Conditions and measures related to municipal sewage treatment plant

**Flow rate of sewage treatment plant effluent**: 2,000 m³/d  
**Remarks**: Not applicable as there is no release to wastewater.

### Conditions and measures related to external treatment of waste for disposal

**Waste treatment**: External treatment and disposal of waste should comply with applicable local and/or national regulations.

### Conditions and measures related to external recovery of waste

**Recovery Methods**: External recovery and recycling of waste should comply with applicable local and/or national regulations.

---

**PROC8b**: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities  
**PROC15**: Use as laboratory reagent  

Environmental release category: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Further information: Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

## 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure,
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.

Organizational measures to prevent/limit releases, dispersion and exposure
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 evaluation
 Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC6a</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0,178 µg/L</td>
<td>Freshwater</td>
<td>0,0266</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0,167 µg/L</td>
<td>Marine water</td>
<td>0,249</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0,732 µg/kg</td>
<td>Freshwater sediment</td>
<td>0,0631</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0,685 µg/kg</td>
<td>Marine water</td>
<td>0,590</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>2,52 µg/kg</td>
<td>Soil</td>
<td>0,364</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

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

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: Injection as odorant in fuels – industrial

Main User Groups
SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU 3: Industrial Manufacturing (all)
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

Process category
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
Scentinel® E Gas Odorant

Environmental release category: ERC7: Industrial use of substances in closed systems

Further information: Covers injection as odourant in fuel and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2.1 Contributing scenario controlling environmental exposure for: ERC7: Industrial use of substances in closed systems

Product characteristics
Viscosity, dynamic: 1.6 mPa.s at 20 °C

Environment factors not influenced by risk management
Flow rate: 18,000 m3/d
Dilution Factor (River): 10
Dilution Factor (Coastal Areas): 100

Other given operational conditions affecting environmental exposure
Number of emission days per year: 365
Emission or Release Factor: Air: 0.25 %
Emission or Release Factor: Water: 0.001 %
Emission or Release Factor: Soil: 0 %

Technical conditions and measures / Organizational measures
Air: Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99.8 %)
Water: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of z (%): (Effectiveness: 99.9 %)
Remarks: Soil emission controls are not applicable as there is no direct release to soil.
Remarks: Negligible wastewater emissions as process operates without water contact.
Remarks: Wastewater emissions generated from equipment cleaning with water.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent: 2,000 m3/d
Remarks: Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal
Waste treatment: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste
Recovery Methods: External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in...
SAFETY DATA SHEET

**Scentinel® E Gas Odorant**

Version 3.0  Revision Date 2018-04-02

**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, Use as laboratory reagent**

Organizational measures to prevent /limit releases, dispersion and exposure
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 evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartments</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td></td>
<td>0.0324 µg/L</td>
<td>0.00484</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td></td>
<td>0.0301 µg/L</td>
<td>0.0449</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td>0.124 µg/kg</td>
<td>0.107</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td></td>
<td>0.133 µg/kg</td>
<td>0.0115</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td></td>
<td>1.61 µg/kg</td>
<td>0.233</td>
<td></td>
</tr>
</tbody>
</table>

ERC7: Industrial use of substances in closed systems

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

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.