# SAFETY DATA SHEET

## Scintinel® F-20 Gas Odorant

**Version 2.1**  
**Revision Date 2018-04-12**

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

#### Product information

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Scintinel® F-20 Gas Odorant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>1121154, 1087135, 1024692, 1024694, 1024693, 1024690, 1024691, 1024789, 1105015</td>
</tr>
</tbody>
</table>

#### EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Legal Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EC-No.</td>
<td>Registration number</td>
</tr>
<tr>
<td></td>
<td>Index No.</td>
<td></td>
</tr>
</tbody>
</table>

| t-Butyl Mercaptan   | 75-66-1 | Chevron Phillips Chemicals International NV |
|                    | 200-890-2 | 01-2119491288-26-0000 |
| Dimethyl Sulfide    | 75-18-3 | Chevron Phillips Chemicals International NV |
|                    | 200-846-2 | 01-2119487127-32-0001 |

### Relevant Identified Uses

- **Supported**: 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 Vincielaan 19  
  1831 Diegem  
  Belgium

- **SDS Requests**: (800) 852-5530  
  **Technical Information**: (832) 813-4862  
  **Responsible Party**: Product Safety Group  
  **Email**: sds@cpchem.com

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**Emergency telephone**:  
**SDS Number**: 100000013404

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1/27
Health:
866.442.9628 (North America)
1.832.813.4984 (International)

Transport:
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: CHEMWATCH (+61 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department : Product Safety and Toxicology Group
E-mail address : SDS@CPChem.com
Website : www.CPChem.com

ODOR-FADE WARNING

A GAS LEAK CAN CAUSE A FIRE OR EXPLOSION RESULTING IN SERIOUS INJURY OR DEATH.

Be aware that the stenching chemical added to gas to make it detectable may not warn of a gas leak or the presence of propane or natural gas to all persons in every instance.

Instances where the odorant in an odorized gas may be undetectable include:

- Odor intensity may fade or be eliminated for a variety of chemical and physical causes, including the oxidation of rusting pipes, adsorption into or sticking onto the interior of pipes or appliances, or absorption into liquids.
- Contact with soil in underground leaks may de-odorize or remove odorant from the gas.
- Some people have a diminished ability, or inability to smell the stench. Factors that negatively affect a person’s sense of smell include age, gender, medical conditions, and alcohol/tobacco usage.
- The stench of odorized gas may not awaken sleeping persons.
- Other odors may mask or hide the stench.
- Exposure to the odor for even a short period of time, may cause nasal fatigue, where a person can no longer smell the stench.

Gas detectors listed by the Underwriters Laboratories (UL) can be used as an extra measure of safety for detecting gas leaks, especially under conditions where the odorant alone may not provide an adequate warning. Gas detectors emit a loud, shrill sound when gas is present and do not depend on sense of smell. Because the odor intensity can fade or people may have problems with their sense of smell, we recommend installing, per manufacturer’s instructions, one or more combustible gas detectors, in suitable locations to ensure adequate coverage to detect gas leaks.

Educate yourself, your employees, and your customers with the content of this warning and other important facts associated with the so-called “odor-fade phenomenon.”

SECTION 2: Hazards identification

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

<table>
<thead>
<tr>
<th>Classification</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids, Category 2</td>
<td>H225</td>
</tr>
<tr>
<td>Skin sensitization, Category 1</td>
<td>H317</td>
</tr>
<tr>
<td>Chronic aquatic toxicity, Category 2</td>
<td>H411</td>
</tr>
</tbody>
</table>

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

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms:

- Flammable
- Caution
- Aquatic hazard

Signal Word: Danger

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

Precautionary Statements:

Prevention:
- P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233: Keep container tightly closed.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
- P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
- P391: Collect spillage.

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

SECTION 3: Composition/information on ingredients

Synonyms:
- Gas Odorant
- Mercaptan Mixture

Molecular formula: Mixture

Hazardous ingredients:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-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</td>
<td>Flam. Liq. 2; H225 Aquatic Acute 2; H401 Skin Sens. 1; H317 Aquatic Chronic 2; H411</td>
<td>78 - 82</td>
</tr>
<tr>
<td></td>
<td>200-890-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimethyl Sulfide</td>
<td>75-18-3</td>
<td>Flam. Liq. 2; H225</td>
<td>18 - 22</td>
</tr>
<tr>
<td></td>
<td>200-846-2</td>
<td></td>
<td></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. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

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

In case of skin contact : If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution. 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. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point : $< -18 \, ^\circ C \, (\, < 0 \, ^\circ F \, )$

Autoignition temperature : No data available

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media : High volume water jet.

Specific hazards during firefighting : 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. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. 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. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. 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

Ingredients with workplace control parameters

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>

SDS Number: 100000013404 5/27
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
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: Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.

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>Form</td>
<td>Liquid</td>
</tr>
<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>&lt; -18 °C (&lt; 0 °F) estimated</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No</td>
</tr>
<tr>
<td>Autoignition temperature</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>
</tbody>
</table>
### Scentinel® F-20 Gas Odorant

**Version 2.1**

**Revision Date** 2018-04-12

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Pour point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>-45.6 °C (-50.1 °F)</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>48.9 - 93.3 °C (120.0 - 199.9 °F)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>8.20 PSI estimated at 38 °C (100 °F)</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.816 at 15.6 °C (60.1 °F)</td>
</tr>
<tr>
<td>Density</td>
<td>813.6 g/l</td>
</tr>
<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>No data available</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**: Heat, flames and sparks.
- **Hazardous decomposition products**: Carbon oxides, Sulfur oxides
- **Other data**: No decomposition if stored and applied as directed.

### SECTION 11: Toxicological information

**Acute oral toxicity**

- **t-Butyl Mercaptan**: LD50: 4.729 mg/kg
  - Species: Rat
  - Sex: male
### Dimethyl Sulfide

**LD50**: > 2,000 mg/kg  
**Species**: Rat  
**Method**: OECD Test Guideline 423

### Acute Inhalation Toxicity

**t-Butyl Mercaptan**  
**LC50**: 98.3 mg/l  
**Exposure time**: 4 h  
**Species**: Rat  
**Sex**: Male and female  
**Test atmosphere**: vapor  
**Method**: OECD Test Guideline 403

**LC50**: 81.9 mg/l  
**Exposure time**: 4 h  
**Species**: Rat  
**Sex**: Male  
**Test atmosphere**: vapor  
**Method**: OECD Test Guideline 403

**LC50**: 60.9 mg/l  
**Exposure time**: 4 h  
**Species**: Mouse  
**Sex**: Male  
**Test atmosphere**: vapor  
**Method**: OECD Test Guideline 403

**Dimethyl Sulfide**  
**LC50**: 102 mg/l  
**Exposure time**: 4 h  
**Species**: Rat  
**Sex**: Male and female  
**Test atmosphere**: gas  
**Method**: OECD Test Guideline 403

### Acute Dermal Toxicity

**Dimethyl Sulfide**  
**LD50**: > 2,000 mg/kg  
**Method**: OECD Test Guideline 402

### Scentinel® F-20 Gas Odorant

**Skin Irritation**: May cause skin irritation and/or dermatitis.

**Eye Irritation**: Vapors may cause irritation to the eyes, respiratory system and the skin.

**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

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

Dimethyl Sulfide
Species: Rat
Application Route: Oral diet
Dose: 0, 2.5, 25, 250 mg/kg bw/day
Exposure time: 14 wk
Number of exposures: Daily
NOEL: 250 mg/kg

Species: Rat, Male and female
Sex: Male and female
Application Route: inhalation (vapor)
Dose: 0, 0.310, 0.964, 2.783 mg/l
Exposure time: 13 wk (6 h)
Number of exposures: 7 d/wk
NOEL: 2,783 mg/l
Method: OECD Guideline 413
Information given is based on data obtained from similar substances.

Reproductive toxicity

<table>
<thead>
<tr>
<th>Substance</th>
<th>Species</th>
<th>Sex</th>
<th>Application Route</th>
<th>Dose</th>
<th>Exposition time</th>
<th>NOAEL Parent</th>
<th>NOAEL F1</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butyl Mercaptan</td>
<td>Species: Rat</td>
<td>Sex: male and female</td>
<td>Application Route: oral gavage</td>
<td>Dose: 10, 50, 200 mg/kg bw/day</td>
<td>Number of exposures: Daily</td>
<td>Test period: 42 -53 days</td>
<td>Method: OECD Guideline 422</td>
<td>NOAEL Parent: 200 mg/kg bw/day</td>
</tr>
</tbody>
</table>

Developmental Toxicity

<table>
<thead>
<tr>
<th>Substance</th>
<th>Species: Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butyl Mercaptan</td>
<td></td>
</tr>
</tbody>
</table>
### 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

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### Dimethyl Sulfide
- **Species:** Rat
- **Application Route:** oral gavage
- **Dose:** 100, 500, 1000 mg/kg
- **Exposure time:** GD 6 - 19
- **Number of exposures:** daily
- **Test period:** 20 d
- **Method:** OECD Guideline 414
- **NOAEL Teratogenicity:** 1.000 mg/kg
- **NOAEL Maternal:** 1.000 mg/kg

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### 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

**Dimethyl Sulfide**
- **Carcinogenicity:** Not available
- **Mutagenicity:** Tests on bacterial or mammalian cell cultures did not show mutagenic effects. In vivo tests did not show mutagenic effects.
- **Teratogenicity:** Animal testing did not show any effects on fetal development.
- **Reproductive toxicity:** Animal testing did not show any effects on fertility.

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### Further information

**Scentinel® F-20 Gas Odorant**
- **Aspiration toxicity:** May be harmful if swallowed and enters airways.

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**Scentinel® F-20 Gas Odorant**
- **Further information:** Solvents may degrease the skin.

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**SDS Number:** 100000013404

**Revision Date:** 2018-04-12
SECTION 12: Ecological information

Toxicity to fish

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

- **Dimethyl Sulfide**: LC50: 213 mg/l
  
  Exposure time: 96 h
  
  Species: Oncorhynchus mykiss (rainbow trout)
  
  Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

- **t-Butyl Mercaptan**: EC50: 6.7 mg/l
  
  Exposure time: 48 h
  
  Species: Daphnia magna (Water flea)
  
  Method: OECD Test Guideline 202

- **Dimethyl Sulfide**: EC50: 29 mg/l
  
  Exposure time: 48 h
  
  Species: Daphnia magna (Water flea)
  
  Method: OECD Test Guideline 202

Toxicity to algae

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

- **Dimethyl Sulfide**: IC50: > 113.7 mg/l
  
  Exposure time: 72 h
  
  Species: Selenastrum capricornutum (algae)
  
  Method: OECD Test Guideline 201

Bioaccumulation

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

Biodegradability

- **t-Butyl Mercaptan**: aerobic
  
  Result: Not readily biodegradable.
  
  Testing period: 63 d
  
  Method: OECD Test Guideline 301

- **Dimethyl Sulfide**: aerobic
  
  Result: Readily biodegradable.
  
  77 %
**Ecotoxicology Assessment**

**Acute aquatic toxicity**

- **t-Butyl Mercaptan**: Toxic to aquatic life.
- **Dimethyl Sulfide**: Harmful to aquatic life.

**Chronic aquatic toxicity**

- **t-Butyl Mercaptan**: Toxic to aquatic life with long lasting effects.

**Results of PBT assessment**

- This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

**Additional ecological information**

- 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, DIMETHYL SULFIDE), 3, II

SDS Number: 100000013404

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IMD (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, DIMETHYL SULFIDE), 3, II, (< -18 °C), MARINE POLLUTANT, (TERTIARY BUTYL MERCAPTAN)

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

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

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

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

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

SECTION 15: Regulatory information

National legislation
Chemical Safety Assessment
Ingredients : 2-methylpropane-2-thiol A Chemical Safety Assessment has been carried out for this substance. 200-890-2

Chemical Safety Assessment
dimethyl sulphide 200-846-2

Major Accident Hazard Legislation
: 96/82/EC Update: 2003 Highly flammable 7b Quantity 1: 5.000 t Quantity 2: 50.000 t

: 96/82/EC Update: 2003 Dangerous for the environment

SDS Number:100000013404 14/27
Scentinel® F-20 Gas Odorant

SECTION 16: Other information

NFPA Classification

Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0

Further information

Legacy SDS Number: 34930

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.

Key or legend to abbreviations and acronyms used in the safety data sheet

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</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 Chemical Substances</td>
</tr>
</tbody>
</table>
**SAFETY DATA SHEET**

**Scentinel® F-20 Gas Odorant**

Version 2.1

**Revision Date 2018-04-12**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>EC50 Effective Concentration</th>
<th>NOAEL No Observable Adverse Effect Level</th>
<th>EC50 Effective Concentration 50%</th>
<th>NOEC No Observed Effect Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>OSHA Occupational Safety &amp; Health Administration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>PEL Permissible Exposure Limit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>PICCS Philippines Inventory of Commercial Chemical Substances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>PRNT Presumed Not Toxic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>RCRA Resource Conservation Recovery Act</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>STEL Short-term Exposure Limit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>SARA Superfund Amendments and Reauthorization Act</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>TLV Threshold Limit Value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>TWA Time Weighted Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>TSCA Toxic Substance Control Act</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>UVCB Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOSCA European Oilfield Specialty Chemicals Association</td>
<td>WHMIS Workplace Hazardous Materials Information System</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- **H225**: Highly flammable liquid and vapor.
- **H317**: May cause an allergic skin reaction.
- **H401**: Toxic to aquatic life.
- **H411**: Toxic to aquatic life with long lasting effects.
Annex

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

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

| 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 | Lead substance(s)  
 |                   | EC-No. 200-890-2  
 |                   | Ec-No. 200-846-2  
 |                   | Distribution of Substance: loading (including marine vessel/barge, rail/road car IBC loading), and repacking including drums and small packs of substance, including its distribution and associated laboratory activities. |

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 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
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

Other given operational conditions affecting environmental exposure

Number of emission days per year : 300
Emission or Release Factor: Air : 0,01 %
Emission or Release Factor: Water : 0,001 %
Emission or Release Factor: Soil : 0,001 %

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 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

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, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0,107 µg/L</td>
<td>0,016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0,10 µg/L</td>
<td>0,149</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0,44 µg/kg</td>
<td>0,0379</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0,411 µg/kg</td>
<td>0,354</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>1,63 µg/kg</td>
<td>0,236</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario
### 1. Short title of Exposure Scenario: **Formulation**

<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>SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)</td>
</tr>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td>PROC2: Use in closed, continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td></td>
<td>PROC3: Use in closed batch process (synthesis or formulation)</td>
</tr>
<tr>
<td></td>
<td>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td>PROC5: Mixing or blending in batch processes for formulation of mixtures and articles</td>
</tr>
<tr>
<td></td>
<td>(multistage and/or significant contact) Industrial setting;</td>
</tr>
<tr>
<td></td>
<td>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</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>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</td>
</tr>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental release category</th>
<th>ERC2: Formulation of preparations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further information</td>
<td>Lead substance(s)</td>
</tr>
<tr>
<td></td>
<td>EC-No. 200-890-2</td>
</tr>
<tr>
<td></td>
<td>Ec-No. 200-846-2</td>
</tr>
</tbody>
</table>

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

---

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 preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Scentinel® F-20 Gas Odorant

Version 2.1
Revision Date 2018-04-12

line, including weighing), Use as laboratory reagent

Amount used
Remarks : Not applicable

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 ≥ (%) :
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 preparation (charging/discharging) from/to vessels/large containers at dedicated
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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>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>ERC2</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td></td>
<td>0.0395 µg/L</td>
<td>0.00589</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td></td>
<td>0.0367 µg/L</td>
<td>0.0548</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td></td>
<td>0.162 µg/kg</td>
<td>0.0140</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td>0.151 µg/kg</td>
<td>0.130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td></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

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.

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

SDS Number:100000013404  22/27
**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:** ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

**Further information:**
- Lead substance(s)
  - EC-No. 200-890-2
  - Ec-No. 200-846-2
- Use as an isolated intermediate under strictly controlled conditions

### 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

### Amount used

**Remarks:** Not applicable

### 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.

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>0.0266</td>
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<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.167 µg/L</td>
<td>0.249</td>
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<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.732 µg/kg</td>
<td>0.0631</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.685 µg/kg</td>
<td>0.590</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>2.52 µg/kg</td>
<td>0.364</td>
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</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

SDS Number: 100000013404 24/27
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.

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
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)
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 : ERC7: Industrial use of substances in closed systems
Further information : Lead substance(s)
Ec-No. 200-846-2
EC-No. 200-890-2
Covers injection as odourant in fuel and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, 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), 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

Amount used
Remarks : Not applicable

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 ≥ (%): (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 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>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
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<tbody>
<tr>
<td>ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.0324 µg/L</td>
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<td>Marine water</td>
<td>0.0301 µg/L</td>
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<td>Marine sediment</td>
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<td>Freshwater sediment</td>
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<td>Soil</td>
<td>1.61 µg/kg</td>
<td>0.233</td>
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</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

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. 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.