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

1.1

Product information

Product Name: Scentinel® T Gas Odorant
Material:
- 1121590, 1119675, 1111642, 1108705, 1105021, 1091012, 1093286, 1098227, 1099968, 1093716, 1070716, 1086438, 1097237, 1076222, 1086439, 1024792, 1024724, 1024797, 1024795, 1028520, 1024791, 1024723, 1024794, 1024796, 1024793

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index No.</th>
<th>Legal Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrothiophene</td>
<td>110-01-0</td>
<td>203-728-9</td>
<td>613-087-00-0</td>
<td>Chevron Phillips Chemicals International NV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01-2119489799-07-0001</td>
</tr>
</tbody>
</table>

1.2

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

Relevant Identified Uses: Manufacture
- Distribution
- Formulation
- Injection as odorant in fuels – industrial

1.3

Details of the supplier of the safety data sheet

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 Number: 100000068737
Emergency telephone:

**Health:**
866.442.9628 (North America)
1.832.813.4984 (International)

**Transport:**
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: CHEMWATCH (+612 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

2.1
### Classification of the substance or mixture

**REGULATION (EC) No 1272/2008**

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids, Category 2</td>
</tr>
<tr>
<td>Acute toxicity, Category 4</td>
</tr>
<tr>
<td>Acute toxicity, Category 4</td>
</tr>
<tr>
<td>Acute toxicity, Category 4</td>
</tr>
<tr>
<td>Skin irritation, Category 2</td>
</tr>
<tr>
<td>Eye irritation, Category 2</td>
</tr>
<tr>
<td>Long-term (chronic) aquatic hazard, Category 3</td>
</tr>
</tbody>
</table>

### 2.2 Labeling (REGULATION (EC) No 1272/2008)

**Hazard pictograms**

- **Signal Word**: Danger

**Hazard Statements**

- **H225**: Highly flammable liquid and vapor.
- **H302 + H312 + H332**: Harmful if swallowed, in contact with skin or if inhaled.
- **H315**: Causes skin irritation.
- **H319**: Causes serious eye irritation.
- **H412**: Harmful 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.
  - P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
  - P264: Wash skin thoroughly after handling.
  - P273: Avoid release to the environment.

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

Hazardous ingredients which must be listed on the label:

- 110-01-0 Tetrahydrothiophene

### SECTION 3: Composition/information on ingredients

3.1 - 3.2

SDS Number:100000068737
Scentinel® T Gas Odorant

Version 5.0
Revision Date 2018-11-29

Substance or Mixture
Synonyms : Tetrahydrothiophene
Thiophane
THT
Molecular formula : C4H8S

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>Tetrahydrothiophene</td>
<td>110-01-0</td>
<td>Flam. Liq. 2; H225</td>
<td>99 - 100</td>
</tr>
<tr>
<td></td>
<td>203-728-9</td>
<td>Acute Tox. 4; H302</td>
<td></td>
</tr>
<tr>
<td></td>
<td>613-087-00-0</td>
<td>Acute Tox. 4; H332</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 4; H312</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin Irrit. 2; H315</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eye Irrit. 2; H319</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aquatic Chronic 3; H412</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

4.1 Description of 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 : Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.

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. 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 : 13 °C (55 °F)
Method: Tagliabue Open Cup

Autoignition temperature : 215 °C (419 °F)
at 1.013,00 hPa
Method: EU Method A.15

5.1 Extinguishing media

Suitable extinguishing : Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
# SAFETY DATA SHEET

## Scentinel® T Gas Odorant

**Version 5.0**

**Revision Date 2018-11-29**

### 5.2 Special hazards arising from the substance or mixture

**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.

### 5.3 Advice for firefighters

**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

#### 6.1 Personal precautions, protective equipment and emergency procedures

**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.

#### 6.2 Environmental precautions

**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.

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

**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).

#### 6.4 Reference to other sections

**No conditions to be specially mentioned.**
SAFETY DATA SHEET

Scentinel® T Gas Odorant

Version 5.0

Reference to other sections: For personal protection see section 8. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling

Advice on safe handling: Avoid formation of aerosol. Do not breathe vapors/dust. 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.

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.

7.2 Conditions for safe storage, including any incompatibilities

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

8.1 Control parameters

Ingredients with workplace control parameters

DE

<table>
<thead>
<tr>
<th>Inhaltsstoffe</th>
<th>Grundlage</th>
<th>Wert</th>
<th>Zu überwachende Parameter</th>
<th>Bemerkung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrothiophene</td>
<td>DE TRGS 900 AGW</td>
<td>50 ppm, 180 mg/m³</td>
<td>DFG, H, Y,</td>
<td></td>
</tr>
</tbody>
</table>

DFG Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission)
H Hautresorptiv
Y Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden

CH

<table>
<thead>
<tr>
<th>Inhaltsstoffe</th>
<th>Grundlage</th>
<th>Wert</th>
<th>Zu überwachende Parameter</th>
<th>Bemerkung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrothiophene</td>
<td>CH SUVA MAK-Wert</td>
<td>50 ppm, 180 mg/m³</td>
<td>SSc,</td>
<td></td>
</tr>
<tr>
<td>CH SUVA KZGW</td>
<td>50 ppm, 180 mg/m³</td>
<td>SSc,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SSc Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.

DNEL: End Use: Workers Routes of exposure: Inhalation

SDS Number:100000068737 6/41
Potential health effects: Local effects, Acute effects
Value: 180 mg/m³

DNEL: End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Systemic effects, Chronic effects
Value: 7.5 mg/kg

DNEL: End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Systemic effects, Chronic effects
Value: 180 mg/m³

DNEL: End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Local effects, Chronic effects
Value: 180 mg/m³

DNEL: End Use: Consumer use
Routes of exposure: Inhalation
Potential health effects: Systemic effects, Chronic effects
Value: 18.5 mg/m³

DNEL: End Use: Consumer use
Routes of exposure: Ingestion
Potential health effects: Systemic effects, Chronic effects
Value: 2.7 mg/kg

DNEL: End Use: Consumer use
Routes of exposure: Inhalation
Potential health effects: Local effects, Chronic effects
Value: 21 mg/m³

PNEC: Fresh water
Value: 0.024 mg/l

PNEC: Sea water
Value: 0.0024 mg/l

PNEC: Fresh water sediment
Value: 0.1361 mg/kg

PNEC: Sea sediment
Value: 0.0136 mg/kg

PNEC: Soil
Value: 0.132 mg/kg

8.2 Exposure controls
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 workplace 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 workplace. 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**

### 9.1 Information on basic physical and chemical properties

**Appearance**

<table>
<thead>
<tr>
<th>Property</th>
<th></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>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent</td>
</tr>
</tbody>
</table>

**Safety data**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>13 °C (55 °F) Method: Tagliabue Open Cup</td>
</tr>
</tbody>
</table>

SDS Number: 100000068737
### Scentinel® T Gas Odorant

**Lower explosion limit**: 1.1 % (V)

**Upper explosion limit**: 12.3 % (V)

**Oxidizing properties**: No

**Autoignition temperature**: 215 °C (419 °F) at 1.013,00 hPa

Method: EU Method A.15

**Molecular formula**: C4H8S

**Molecular weight**: 88.1 g/mol

**pH**: Not applicable

**Pour point**: No data available

**Boiling point/boiling range**: 119 °C (246 °F)

**Vapor pressure**: 5.51 kPa at 38 °C (100 °F)

**Density**: 1 g/cm³

**Water solubility**: 5.8 g/l at 20 °C (68 °F)

Method: OECD Test Guideline 105

**Partition coefficient: n-octanol/water**: Pow: 1.8 at 20 °C (68 °F)

**Viscosity, dynamic**: 1.6 mPa.s at 20 °C (68 °F)

**Viscosity, kinematic**: No data available

**Relative vapor density**: No data available

**Evaporation rate**: No data available

**Percent volatile**: > 99 %

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

Stable under recommended storage conditions.
### Chemical stability

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

### 10.3 Possibility of hazardous reactions

**Hazardous reactions**: Hazardous reactions: Hazardous polymerization does not occur.

Further information: No decomposition if stored and applied as directed.

**Hazardous reactions**: Vapors may form explosive mixture with air.

### 10.4 Conditions to avoid

Heat, flames and sparks.

### 10.6 Hazardous decomposition products

Carbon oxides

Sulfur oxides

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

### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

**Scentinel® T Gas Odorant**

**Acute oral toxicity**: Acute toxicity estimate: 1.869 mg/kg

Method: Calculation method

**Scentinel® T Gas Odorant**

**Acute inhalation toxicity**: Acute toxicity estimate: 11.11 mg/l

Exposure time: 4 h

Test atmosphere: vapor

Method: Calculation method

**Scentinel® T Gas Odorant**

**Acute dermal toxicity**: Acute toxicity estimate: 1.112 mg/kg

Method: Calculation method

**Scentinel® T Gas Odorant**

**Skin irritation**: May cause skin irritation in susceptible persons.

**Scentinel® T Gas Odorant**

**Eye irritation**: May cause irreversible eye damage.
Tetrahydrothiophene: Did not cause sensitization on laboratory animals. Information given is based on data obtained from similar substances.

Repeated dose toxicity
Tetrahydrothiophene: Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 51, 236, 1442 ppm
Exposure time: 13 wk
Number of exposures: 6 h/d, 5 d/wk
NOEL: 51 ppm
Method: OECD Guideline 413
Target Organs: Upper respiratory tract

Genotoxicity in vitro
Tetrahydrothiophene: Test Type: Ames test
Method: Mutagenicity (Escherichia coli - reverse mutation assay)
Result: negative

Test Type: Cytogenetic assay
Result: negative

Test Type: HGPRT assay
Result: negative

Test Type: Sister Chromatid Exchange Assay
Method: OECD Guideline 473
Result: negative

Test Type: Unscheduled DNA synthesis assay
Result: negative

Developmental Toxicity
Tetrahydrothiophene: Species: Rat
Application Route: Inhalation
Dose: 234, 782, 1910 ppm
Method: OECD Guideline 414
NOAEL Teratogenicity: 1910 ppm
NOAEL Maternal: 234 ppm
No adverse effects expected

Scentinel® T Gas Odorant Aspiration toxicity: May be harmful if swallowed and enters airways.

CMR effects
Tetrahydrothiophene: Mutagenicity: Tests on bacterial or mammalian cell cultures 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.
**SECTION 12: Ecological information**

**12.1 Toxicity**

**Toxicity to fish**
Tetrahydrothiophene: LC50: > 24 mg/l
Species: Danio rerio (Zebra Fish)
Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates**
Tetrahydrothiophene: EC50: 24 mg/l
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 202

**Toxicity to algae**
Tetrahydrothiophene: EC50: > 153,2 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

**Toxicity to bacteria**
Tetrahydrothiophene: EC50: 1.530 mg/l
Respiration inhibition
Method: OECD Test Guideline 209

**12.2 Persistence and degradability**

**Biodegradability**
Tetrahydrothiophene: < 10 %
According to the results of tests of biodegradability this product is not readily biodegradable.

**12.3 Bioaccumulative potential**

**Bioaccumulation**
Tetrahydrothiophene: Bioaccumulation is unlikely.

**12.4 Mobility in soil**
Mobility

Tetrahydrothiophene: The product will be dispersed amongst the various environmental compartments (soil/ water/ air).

12.5 Results of PBT and vPvB assessment

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.

12.6 Other adverse effects

Additional ecological information: Harmful to aquatic life with long lasting effects.

Ecotoxicology Assessment

Long-term (chronic) aquatic hazard

Tetrahydrothiophene: Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

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

14.1 - 14.7

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)**
UN2412, TETRAHYDROTHIOPHENE, 3, II

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**
UN2412, TETRAHYDROTHIOPHENE, 3, II, (13 °C)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**
UN2412, TETRAHYDROTHIOPHENE, 3, II

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**
UN2412, TETRAHYDROTHIOPHENE, 3, II, (D/E)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**
UN2412, TETRAHYDROTHIOPHENE, 3, II

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**
UN2412, TETRAHYDROTHIOPHENE, 3, II

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

**SECTION 15: Regulatory information**

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

National legislation


**Water contaminating class** : WGK 2 water endangering

(Germany)

15.2 Chemical Safety Assessment

**Components** : tetrahydrothiophene

A Chemical Safety Assessment has been carried out for this substance.

**Major Accident Hazard Legislation** : 96/82/EC

Update: 2003

Highly flammable
**SAFETY DATA SHEET**

**Scentinel® T Gas Odorant**

Version 5.0  
Revision Date 2018-11-29

**Quantity**
- Quantity 1: 5.000 t
- Quantity 2: 50.000 t

**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
- Japan ISHL: 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.

**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>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Agency</td>
</tr>
</tbody>
</table>

SDS Number:100000068737
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration 50%</td>
</tr>
<tr>
<td>EGEST</td>
<td>EOSCA Generic Exposure Scenario Tool</td>
</tr>
<tr>
<td>EOSCA</td>
<td>European Oilfield Specialty Chemicals Association</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Chemical Substances</td>
</tr>
<tr>
<td>MAK</td>
<td>Germany Maximum Concentration Values</td>
</tr>
<tr>
<td>GHS</td>
<td>Globally Harmonized System</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater Than or Equal To</td>
</tr>
<tr>
<td>IC50</td>
<td>Inhibition Concentration 50%</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
</tr>
<tr>
<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</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>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>NZIoC</td>
<td>New Zealand Inventory of Chemicals</td>
</tr>
<tr>
<td>NOAEL</td>
<td>No Observable Adverse Effect Level</td>
</tr>
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<td>NOEC</td>
<td>No Observed Effect Concentration</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety &amp; Health Administration</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
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<tr>
<td>PICCS</td>
<td>Philippines Inventory of Commercial Chemical Substances</td>
</tr>
<tr>
<td>PRNT</td>
<td>Presumed Not Toxic</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation Recovery Act</td>
</tr>
<tr>
<td>STEL</td>
<td>Short-term Exposure Limit</td>
</tr>
<tr>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
</tr>
<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>TSCA</td>
<td>Toxic Substance Control Act</td>
</tr>
<tr>
<td>UVCB</td>
<td>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
</tr>
<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</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.
- **H312**: Harmful in contact with skin.
- **H315**: Causes skin irritation.
- **H319**: Causes serious eye irritation.
- **H332**: Harmful if inhaled.
- **H412**: Harmful to aquatic life with long lasting effects.
Annex

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

- **Main User Groups**: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
  - SU3, SU8, SU9: Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
- **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
  - PROC3: Use in closed batch process (synthesis or formulation)
  - 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, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles
- **Further information**: 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

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

- **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 %
  - 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: Soil emission controls are not applicable as there is no direct release to soil.
  - Remarks: Prevent environmental discharge consistent with regulatory requirements.
# SAFETY DATA SHEET

## Scentinel® T Gas Odorant

**Version 5.0**

**Revision Date 2018-11-29**

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

**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.

**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: Use in closed process, no likelihood of exposure

#### Product characteristics

**Remarks**

Liquid, vapour pressure 0.5 - 10 kPa at STP

#### Amount used

**Remarks**

Not applicable

#### Frequency and duration of use

**Remarks**

Covers daily exposures up to 8 hours (unless stated differently)

#### Other operational conditions affecting workers exposure

**Remarks**

Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Technical conditions and measures

Handle substance within a closed system., Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

#### Organizational measures to prevent /limit releases, dispersion and exposure

Locate bulk storage outdoors

#### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

#### Product characteristics

**Remarks**

Liquid, vapour pressure 0.5 - 10 kPa at STP

#### Amount used

**Remarks**

Not applicable

#### Frequency and duration of use

**Remarks**

Covers daily exposures up to 8 hours (unless stated differently)

#### Other operational conditions affecting workers exposure

**Remarks**

Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

---

**SDS Number:** 100000068737  18/41
Technical conditions and measures
Handle substance within a closed system., Ensure material transfers are under containment or extract ventilation.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : Not applicable

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

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : Not applicable

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

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

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>ERC1, ERC4</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>Marine water</td>
<td>0.0016 µg/L</td>
<td>0.000067</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0044 µg/kg</td>
<td>0.00015</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.0004 µg/kg</td>
<td>0.000131</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.0067 µg/m³</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

### Workers/Consumers

<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>PROC1, CS15, CS54, CS57</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.03 mg/kg/d</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC1, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>7 ppm</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.03 mg/kg/d</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3, CS15, CS2, CS55</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>2.5 ppm</td>
<td>0.1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.034 mg/kg/d</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.05</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PROC8b, CS14, CS2</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
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<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.19</td>
<td></td>
<td></td>
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<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1 ppm</td>
<td>0.0</td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.034 mg/kg/d</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure  
CS15: General exposures (closed systems)  
CS54: Continuous process  
CS57: no sampling  
PROC1: Use in closed process, no likelihood of exposure  
CS67: Storage
PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
CS2: Process sampling
CS55: Batch process

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
CS14: Bulk transfers
CS2: Process sampling

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.

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>: 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 | 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, ERC12a

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, Industrial processing of articles with abrasive techniques (low release)

### 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

**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: Use in closed process, no likelihood of exposure

### Product characteristics

**Remarks**: Liquid, vapour pressure 0.5 - 10 kPa at STP

### Amount used

**Remarks**: Not applicable

### Frequency and duration of use

**Remarks**: Covers daily exposures up to 8 hours (unless stated differently)
### Other operational conditions affecting workers exposure

**Remarks**

Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Technical conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), Handle substance within a closed system.

### Organizational measures to prevent /limit releases, dispersion and exposure

Locate bulk storage outdoors

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

#### Product characteristics

**Remarks**

Liquid, vapour pressure 0.5 - 10 kPa at STP

#### Amount used

**Remarks**

Not applicable

#### Frequency and duration of use

**Remarks**

Covers daily exposures up to 8 hours (unless stated differently)

#### Other operational conditions affecting workers exposure

**Remarks**

Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Technical conditions and measures

Handle substance within a closed system., Ensure operation is undertaken outdoors., Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

#### Organizational measures to prevent /limit releases, dispersion and exposure

Locate bulk storage outdoors

#### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

#### Product characteristics

**Remarks**

Liquid, vapour pressure 0.5 - 10 kPa at STP

#### Amount used

**Remarks**

Not applicable

#### Frequency and duration of use

**Remarks**

Covers daily exposures up to 8 hours (unless stated differently)
## Other operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
</tbody>
</table>

## Technical conditions and measures

- Handle substance within a closed system., Ensure material transfers are under containment or extract ventilation., Ensure samples are obtained under containment or extract ventilation.

## Conditions and measures related to personal protection, hygiene and health evaluation

- Wear suitable gloves tested to EN374.

## 2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
</tbody>
</table>

## Technical conditions and measures

- Ensure material transfers are under containment or extract ventilation.

## Conditions and measures related to personal protection, hygiene and health evaluation

- Wear suitable gloves tested to EN374.

## 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Scentinell® T Gas Odorant

Version 5.0

Revision Date 2018-11-29

Technical conditions and measures
Drain down and flush system prior to equipment opening or maintenance., Limit the substance content in the product to 5 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : Not applicable

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

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure material transfers are under containment or extract ventilation., Ensure operation is undertaken outdoors., Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : Not applicable

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

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Transfer via enclosed lines.

Conditions and measures related to personal protection, hygiene and health evaluation

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Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

**Product characteristics**
- **Remarks**
  - Liquid, vapour pressure 0.5 - 10 kPa at STP

**Amount used**
- **Remarks**
  - Not applicable

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

**Other operational conditions affecting workers exposure**
- **Remarks**
  - Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
- Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

**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>ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
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<td>0,0022 mg/L</td>
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<td></td>
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<td>0,0003 mg/L</td>
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<td>Freshwater sediment</td>
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<td>0,006 mg/kg</td>
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<td></td>
<td></td>
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<td>Marine sediment</td>
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<td>0,0008 mg/kg</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td></td>
<td>0,0001 mg/m³</td>
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</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

**Workers/Consumers**

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<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15, CS54, CS57</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.03 mg/kg/d</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC1, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>7 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>PROC2, CS15, CS54, CS56, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>7 ppm</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.2</td>
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<tr>
<td></td>
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<td>Worker – long-term – systemic Combined routes</td>
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<tr>
<td>PROC3, CS52, CS15, CS55</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>2.5 ppm</td>
<td>0.1</td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.034 mg/kg/d</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<tr>
<td>PROC4, CS16</td>
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<td>Worker – inhalation, long-term – systemic</td>
<td>2 ppm</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS39</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.371 mg/kg/d</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.28</td>
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<tr>
<td>PROC8b, CS14, CS107</td>
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<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.19</td>
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</tr>
<tr>
<td>PROC8b, CS108</td>
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<td>35 ppm</td>
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<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
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<tr>
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<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<td>0.79</td>
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<tr>
<td>PROC9, CS6</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.19</td>
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<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1 ppm</td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.034 mg/kg/d</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic</td>
<td></td>
<td>0.02</td>
<td></td>
</tr>
</tbody>
</table>
**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

Confirm that RMMs and OCs are as described or of equivalent efficiency.

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    | SU 3, 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 |
|                  | PROC5: Continuous process |
|                  | PROC6: with sample collection |
|                  | PROC7: Storage |
|                  | PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
|                  | PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities |
|                  | PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
|                  | PROC10: Drum and small package filling |
|                  | PROC15: Use as laboratory reagent |
| SDS Number       | 100000068737 |
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
PROC 15: 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

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 a typical 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 %)
Soil: Treat soil emission to provide the required removal efficiency of (%): (Effectiveness: > 99.9 %)

Conditions and measures related to municipal sewage treatment plant
Remarks: Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal
## 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

### Product characteristics
- **Remarks**: Liquid, vapour pressure 0.5 - 10 kPa at STP

### Amount used
- **Remarks**: Not applicable

### Frequency and duration of use
- **Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

### Other operational conditions affecting workers exposure
- **Remarks**: Assesses a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Technical conditions and measures
- **Handle substance within a closed system.**
- **Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)**

### Organizational measures to prevent /limit releases, dispersion and exposure
- **Locate bulk storage outdoors**

### Conditions and measures related to personal protection, hygiene and health evaluation
- **Wear suitable gloves tested to EN374.**

## 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

### Product characteristics
- **Remarks**: Liquid, vapour pressure 0.5 - 10 kPa at STP

### Amount used
- **Remarks**: Not applicable

### Frequency and duration of use
- **Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

### Other operational conditions affecting workers exposure
- **Remarks**: Assesses a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Technical conditions and measures
- **Handle substance within a closed system.**
- **Ensure operation is undertaken outdoors.**
- **Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)**

### Organizational measures to prevent /limit releases, dispersion and exposure
### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

#### Product characteristics

| Remarks | Liquid, vapour pressure 0.5 - 10 kPa at STP |

#### Amount used

| Remarks | Not applicable |

#### Frequency and duration of use

| Remarks | Covers daily exposures up to 8 hours (unless stated differently) |

#### Other operational conditions affecting workers exposure

| Remarks | Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. |

#### Technical conditions and measures

Handle substance within a closed system, Ensure material transfers are under containment or extract ventilation.

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC4, PROC9: Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

#### Product characteristics

| Remarks | Liquid, vapour pressure 0.5 - 10 kPa at STP |

#### Amount used

| Remarks | Not applicable |

#### Frequency and duration of use

| Remarks | Covers daily exposures up to 8 hours (unless stated differently) |

#### Other operational conditions affecting workers exposure

| Remarks | Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. |

#### Technical conditions and measures

Ensure material transfers are under containment or extract ventilation.

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.
2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount used</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
<tr>
<td>Other operational conditions affecting workers exposure</td>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
<tr>
<td>Technical conditions and measures</td>
<td>Ensure material transfers are under containment or extract ventilation.</td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
<td>Wear suitable gloves tested to EN374.</td>
</tr>
</tbody>
</table>

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount used</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
<tr>
<td>Other operational conditions affecting workers exposure</td>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
<tr>
<td>Technical conditions and measures</td>
<td>Ensure material transfers are under containment or extract ventilation., Drain down and flush system prior to equipment opening or maintenance.</td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
<td>Wear suitable gloves tested to EN374.</td>
</tr>
</tbody>
</table>

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Product characteristics
Remarks: Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks: Not applicable

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

Other operational conditions affecting workers exposure
Remarks: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide extraction ventilation at points where emissions occur., Ensure material transfers are under containment or extract ventilation.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks: Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks: Not applicable

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

Other operational conditions affecting workers exposure
Remarks: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

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>
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<tbody>
<tr>
<td>ERC2</td>
<td>EUSES</td>
<td>Freshwater</td>
<td></td>
<td>0.0004 mg/L</td>
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<td></td>
<td></td>
<td>Marine water</td>
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<td>0.0549 µg/L</td>
<td>0.0229</td>
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<td></td>
<td></td>
<td>Freshwater</td>
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## Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15, CS54, CS57</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.03 mg/kg/d</td>
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</tr>
<tr>
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<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<td></td>
<td></td>
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<tr>
<td>PROC1, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>7 ppm</td>
<td>0.1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.32</td>
<td></td>
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<tr>
<td>PROC2, CS15, CS54, CS56, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>7 ppm</td>
<td>0.1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3, CS15, CS55</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>2.5 ppm</td>
<td>0.1</td>
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<tr>
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<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.034 mg/kg/d</td>
<td>0.0</td>
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<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<td>0.034 mg/kg/d</td>
<td>0.0</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.2</td>
<td></td>
<td></td>
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<tr>
<td>PROC4, CS16</td>
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<td>2 ppm</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.13</td>
<td></td>
<td></td>
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<tr>
<td>PROC9, CS6</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.686 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC5, CS30</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.371 mg/kg/d</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS22, CS34, CS39</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS8, CS14</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0,1</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>Worker – dermal, long-term – systemic</td>
<td>1,371 mg/kg/d</td>
<td>0,2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker – inhalation, long-term – systemic</td>
<td></td>
<td>0,1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1 ppm</td>
<td>0,0</td>
<td></td>
</tr>
<tr>
<td>Worker – dermal, long-term – systemic</td>
<td></td>
<td>0,034 mg/kg/d</td>
<td>0,02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)
CS54: Continuous process
CS57: no sampling

PROC1: Use in closed process, no likelihood of exposure
CS67: Storage

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS54: Continuous process
CS56: with sample collection
CS67: Storage

PROC3: Use in closed batch process (synthesis or formulation)
CS2: Process sampling
CS15: General exposures (closed systems)
CS55: Batch process

PROC3: Use in closed batch process (synthesis or formulation)
CS136: Batch processes at elevated temperatures

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS16: General exposures (open systems)

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling

PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS30: Mixing operations (open systems)

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS22: Transfer from/pouring from containers
CS34: Manual
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
CS8: Drum/batch transfers
CS14: Bulk transfers
**Scentinel® T Gas Odorant**

**Version 5.0**

**Revision Date 2018-11-29**

PROC15: Use as laboratory reagent  
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.

#### 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**: 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**

**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: 99.7 %)  
- **Water**: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%)
Scentinel® T Gas Odorant

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 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: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
</tbody>
</table>

Technical conditions and measures
- Handle substance within a closed system., Ensure material transfers are under containment or extract ventilation.

Conditions and measures related to personal protection, hygiene and health evaluation
- Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks: Assumes a good basic standard of occupational hygiene is</td>
</tr>
</tbody>
</table>
## Technical conditions and measures
Handle substance within a closed system., Ensure material transfers are under containment or extract ventilation., Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

### Other operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Technical conditions and measures
Drain down and flush system prior to equipment opening or maintenance., Ensure material transfers are under containment or extract ventilation.

### Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid, vapour pressure 0.5 - 10 kPa at STP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

### Other operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

**Conditions and measures related to personal protection, hygiene and health evaluation**

Wear suitable gloves tested to EN374.

### 2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

**Product characteristics**
- **Remarks**: Liquid, vapour pressure 0.5 - 10 kPa at STP

**Amount used**
- **Remarks**: Not applicable

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

**Other operational conditions affecting workers exposure**
- **Remarks**: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.

**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>ERC7</td>
<td>ELUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.0004 mg/L</td>
<td>0.0176</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0548 µg/L</td>
<td>0.0228</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0012 mg/kg</td>
<td>0.0393</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.015 µg/kg</td>
<td>0.0509</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.0008 mg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>0.0024 mg/kg</td>
<td>0.206</td>
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</table>

**ERC7**: Industrial use of substances in closed systems

#### Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15, CS38</td>
<td>ECETOC TRA Modified</td>
<td></td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.03 mg/kg/d</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.00</td>
</tr>
<tr>
<td>PROC1, PROC2</td>
<td>ECETOC TRA</td>
<td></td>
<td>Worker – inhalation,</td>
<td>1 ppm</td>
<td>0.0</td>
</tr>
</tbody>
</table>

SDS Number:100000068737

39/41
## Scentinel® T Gas Odorant

<table>
<thead>
<tr>
<th>Procedure Code</th>
<th>Version</th>
<th>Description</th>
<th>Route</th>
<th>Dermal</th>
<th>Duration</th>
<th>Effect</th>
<th>Inhalation</th>
<th>Duration</th>
<th>Effect</th>
<th>Long-term</th>
<th>Systemic</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS107, CS38, CS67</td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,137 mg/kg/d</td>
<td>0,0</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,04</td>
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</tr>
<tr>
<td>PROC3, CS15, CS37</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>2,5 ppm</td>
<td>0,1</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,034 mg/kg/d</td>
<td>0,0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,05</td>
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</tr>
<tr>
<td>PROC3, CS107, CS37</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>17,5 ppm</td>
<td>0,4</td>
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<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
<td>0,0</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,40</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PROC8a, CS103, CS39</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0,1</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,371 mg/kg/d</td>
<td>0,2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,28</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS14</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>5 ppm</td>
<td>0,1</td>
<td></td>
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<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,1372 mg/kg/d</td>
<td>0,0</td>
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<tr>
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<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,12</td>
<td></td>
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<tr>
<td>PROC8b, CS8</td>
<td>ECETOC TRA</td>
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<td>5 ppm</td>
<td>0,1</td>
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<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,686 mg/kg/d</td>
<td>0,1</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,19</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1 ppm</td>
<td>0,0</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,034 mg/kg/d</td>
<td>0,0</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,02</td>
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<td></td>
</tr>
</tbody>
</table>

**PROC1:** Use in closed process, no likelihood of exposure  
**CS15:** General exposures (closed systems)  
**CS38:** Use in contained systems  

**PROC1:** Use in closed process, no likelihood of exposure  
**PROC2:** Use in closed, continuous process with occasional controlled exposure  
**CS107:** (closed systems)  
**CS38:** Use in contained systems  
**CS67:** Storage  

**PROC3:** Use in closed batch process (synthesis or formulation)  
**CS15:** General exposures (closed systems)  
**CS37:** Use in contained batch processes  

**PROC3:** Use in closed batch process (synthesis or formulation)  
**CS107:** (closed systems)  
**CS37:** Use in contained batch processes  

**PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers

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**SDS Number:** 100000068737  
**Revision Date:** 2018-11-29
at non-dedicated facilities
CS103: Vessel and container cleaning
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS14: Bulk transfers

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS8: Drum/batch transfers

PROC15: Use as laboratory reagent
CS36: Laboratory activities

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.