



## Scentinel® T Gas Odorant

Version 6.6

Revision Date 2024-06-19

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2020/878

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

#### 1.1 Product identifier

##### Product information

Product Name : Scentinel® T Gas Odorant  
 Material : 1127874, 1121590, 1119675, 1111642, 1108705, 1105021,  
 1091012, 1093286, 1098227, 1099968, 1093716, 1070716,  
 1086438, 1097237, 1076222, 1070717, 1084326, 1096486,  
 1086439, 1024792, 1024724, 1024797, 1024795, 1028520,  
 1024791, 1024723, 1024794, 1024796, 1024793

##### EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
Tetrahydrothiophene	110-01-0 203-728-9 613-087-00-0	Chevron Phillips Chemicals International NV 01-2119489799-07-0001

#### 1.2

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

Relevant Identified Uses Supported : 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 Vincilaan 19  
 1831 Diegem  
 Belgium

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SDS Requests: (800) 852-5530  
 Responsible Party: Product Safety Group  
 Email:sds@cpchem.com

**1.4****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

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

EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)

Belgium: 070 245 245 (24 hours/day, 7 days/week)

Bulgaria: +359 2 9154 233

Croatia: +3851 2348 342 (24 hours/day, 7 days/week)

Cyprus: 1401

Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402

Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212

Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Finland: 0800 147 111 09 471 977 (24 hours/day)

France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)

Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Greece: (0030) 2107793777 (24 hours/day, 7 days/week)

Hungary: +36-80-201-199 (24 hours/day, 7 days/week)

Iceland: 543 2222 (24 hours/day, 7 days/week)

Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Italy: POISON CENTER MILAN – Azienda Ospedaliera Niguarda Ca` Grande Tel. +39 02

66101029; POISON CENTER ROME – Policlinico “Agostino Gemelli”, Servizio di tossicologia

clinica Tel. +39 06 3054343; POISON CENTER ROME – Ospedale Pediatrico Bambino Gesù

Tel. +39 06 68593726; POISON CENTER ROME – Policlinico “Umberto I” Tel. +39 06 4997 8000;

POISON CENTER FOGGIA – Azienda Ospedaliera Universitaria Riuniti Tel. +39 0881 732326;

POISON CENTER NAPLES – Azienda Ospedaliera “Antonio Cardarelli” Tel. +39 081 7472870;

POISON CENTER FLORENCE – Azienda Ospedaliera universitaria Careggi Tel. +39 055

7947819; POISON CENTER PAVIA – IRCCS Fondazione Salvatore Maugeri Tel. +39 0382

24444; POISON CENTER BERGAMO – Azienda Ospedaliera “Papa Giovanni XXIII” Tel. 800 883

300; POISON CENTER VERONA – Azienda Ospedaliera Universitaria integrata Tel. 800 011

858;

Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic

Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371

67042473. (24 hours.)

Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Lithuania: +370 (85) 2362052

Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)

Malta: +356 2395 2000

The Netherlands: NVIC: +31 (0)88 755 8000

Norway: 22 59 13 00 (24 hours/day, 7 days/week)

Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Portugal: CIAV phone number: +351 800 250 250

Romania: +40213183606

Slovakia: +421 2 5477 4166

Slovenia: Phone number: 112

Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)

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Sweden: 112 – ask for Poisons Information

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**

Flammable liquids, Category 2	H225: Highly flammable liquid and vapor.
Acute toxicity, Category 4	H302: Harmful if swallowed.
Acute toxicity, Category 4	H332: Harmful if inhaled.
Acute toxicity, Category 4	H312: Harmful in contact with skin.
Skin irritation, Category 2	H315: Causes skin irritation.
Eye irritation, Category 2	H319: Causes serious eye irritation.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

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**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

**2.3****Other hazards**

Results of PBT and vPvB 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.

Endocrine disrupting properties

: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

**SECTION 3: Composition/information on ingredients****3.1 - 3.2****Substance or Mixture**

Synonyms

: Tetrahydrothiophene  
Thiophane  
THT

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Molecular formula : C<sub>4</sub>H<sub>8</sub>S**Hazardous ingredients**

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]	Specific Conc. Limits, M-factors and ATEs
Tetrahydrothiophene	110-01-0 203-728-9 613-087-00-0	Flam. Liq. 2; H225 Acute Tox. 4; H302 Acute Tox. 4; H332 Acute Tox. 4; H312 Skin Irrit. 2; H315 Eye Irrit. 2; H319 Aquatic Chronic 3; H412	99 - 100	

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.

**4.2 Most important symptoms and effects, both acute and delayed****Notes to physician**

- Symptoms : No data available.
- Risks : No data available.

**4.3 Indication of any immediate medical attention and special treatment needed**

- Treatment : No data available.

**SECTION 5: Firefighting measures**

- Flash point : 13°C (55°F)  
Method: Tag closed cup
- Autoignition temperature : 215°C (419°F)

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at 1.013,00 hPa  
Method: EU Method A.15

**5.1****Extinguishing media**

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO<sub>2</sub>). Dry chemical.

Unsuitable extinguishing media : High volume water jet.

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

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 a naked flame or any 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,

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vermiculite) and place in container for disposal according to local / national regulations (see section 13).

Additional advice : No conditions to be specially mentioned.

**6.4 Reference to other sections**

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 a naked flame or any 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.

**7.3****Specific End Use**

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

**SECTION 8: Exposure controls/personal protection****8.1****Control parameters  
Ingredients with workplace control parameters****SI**

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
Tetrahydrothiophene	SI OEL	MV	50 ppm, 180 mg/m <sup>3</sup>	K,
	SI OEL	KTV	50 ppm, 180 mg/m <sup>3</sup>	K,

K Lastnost lažjega prehajanja snovi v organizem skozi kožo

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**DE**

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Tetrahydrothiophene	DE TRGS 900	AGW	50 ppm, 180 mg/m3	H, Y,

H Hautresorptiv

Y Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden

**CH**

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Tetrahydrothiophene	CH SUVA	MAK-Wert	50 ppm, 180 mg/m3	SSc,
	CH SUVA	KZGW	50 ppm, 180 mg/m3	SSc,

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

- DNEL** : End Use: Workers  
Routes of exposure: Inhalation  
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



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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 work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**Personal protective equipment**

- Respiratory protection : If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as:. Air-Purifying Respirator for Organic Vapors. A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
- Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
- Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles.
- Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.
- Hygiene measures : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

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

**SECTION 9: Physical and chemical properties****9.1****Information on basic physical and chemical properties**

SDS Number:100000068737

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**Appearance**

Form : liquid  
Physical state : liquid  
Color : Colorless  
Odor : Pungent

**Safety data**

Flash point : 13°C (55°F)  
Method: Tag closed cup

Lower explosion limit : 1,1 %(V)

Upper explosion limit : 12,3 %(V)

Explosive properties : Not classified

Oxidizing properties : No

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

Molecular formula : C<sub>4</sub>H<sub>8</sub>S

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/cm<sup>3</sup>

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 %

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0,01 %

**9.2****Other information**

Conductivity : No data available

**SECTION 10: Stability and reactivity****10.1****Reactivity** : Stable under recommended storage conditions.**10.2****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.

Hazardous reactions: Vapors may form explosive mixture with air.

**10.4****Conditions to avoid** : Heat, flames and sparks.**10.5****Materials to avoid** : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.**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****Acute oral toxicity**Tetrahydrothiophene : LD50: 1.850 mg/kg  
Species: Rat  
Sex: male and female  
Method: OECD Test Guideline 401**Acute inhalation toxicity**

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Tetrahydrothiophene : LC50: 22,6 mg/l  
Exposure time: 4 h  
Species: Rat  
Sex: male and female  
Test atmosphere: vapor  
Method: OECD Test Guideline 403

**Skin irritation**

Tetrahydrothiophene : Skin irritation

**Eye irritation**

Tetrahydrothiophene : Eye irritation

**Sensitization**

Tetrahydrothiophene : Did not cause sensitization on laboratory animals.  
Information given is based on data obtained from similar substances.  
negative

**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

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

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Aspiration toxicity**

: May be harmful if swallowed and enters airways.

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Specific Target Organ  
Toxicity (Single Exposure)**: Remarks: Not classified due to data which are conclusive :  
although insufficient for classification.**Scentinel® T Gas Odorant  
Specific Target Organ  
Toxicity (Repeated  
Exposure)**: Remarks: Not classified due to data which are conclusive :  
although insufficient for classification.**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.**11.2****Information on other hazards****Scentinel® T Gas Odorant  
Further information**Endocrine disrupting  
properties: Solvents may degrease the skin.  
: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.**SECTION 12: Ecological information****12.1****Toxicity****Toxicity to fish**

Tetrahydrothiophene

: LC50: > 24 mg/l  
Exposure time: 96 h  
Species: Danio rerio (Zebra Fish)  
Method: OECD Test Guideline 203**Toxicity to daphnia and other aquatic invertebrates**

Tetrahydrothiophene

: EC50: 24 mg/l  
Exposure time: 48 h

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Species: *Daphnia magna* (Water flea)  
 Method: OECD Test Guideline 202

**Toxicity to algae**

Tetrahydrothiophene : EC50: > 153,2 mg/l  
 Exposure time: 72 h  
 Species: *Pseudokirchneriella subcapitata* (green algae)  
 Method: OECD Test Guideline 201

**Toxicity to bacteria**

Tetrahydrothiophene : EC50: 1.530 mg/l  
 Exposure time: 3 h  
 Respiration inhibition  
 Method: OECD Test Guideline 209

**12.2****Persistence and degradability**

## Biodegradability

Tetrahydrothiophene : aerobic  
 Result: Not readily biodegradable.  
 < 10 %  
 Testing period: 28 d  
 Method: Directive 67/548/EEC Annex V, C.4.E.

**12.3****Bioaccumulative potential**

## Bioaccumulation

Tetrahydrothiophene : No bioaccumulation is to be expected (log Pow <= 4).

**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****Endocrine disrupting properties**

Endocrine disrupting properties : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at

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levels of 0.1% or higher.

**12.7****Other adverse effects**

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

**12.8****Additional Information****Ecotoxicology Assessment**

Short-term (acute) aquatic hazard  
Tetrahydrothiophene : Harmful to aquatic life.

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.

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**US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)**  
UN2412, TETRAHYDROTHIOPHENE, 3, II

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

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

**Maritime transport in bulk according to IMO instruments**

**SECTION 15: Regulatory information****15.1**

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

Commission Regulation (EU) 2020/878 of 18 June 2020 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

**Water hazard class (Germany)** : WGK 2 water endangering

**15.2**

**Chemical Safety Assessment**

**Components** : tetrahydrothiophene A Chemical Safety Assessment 203-728-9 has been carried out for this substance.

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



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: ZEU\_SEVES3 Update:  
 FLAMMABLE LIQUIDS  
 P5c  
 Quantity 1: 5.000 t  
 Quantity 2: 50.000 t

**Notification status**

Europe REACH : This product is in full compliance according to REACH regulation 1907/2006/EC.

Switzerland CH INV : On the inventory, or in compliance with the inventory

United States of America (USA) TSCA : On or in compliance with the active portion of the TSCA inventory

Australia AIIC : On the inventory, or in compliance with the inventory

New Zealand NZIoC : On the inventory, or in compliance with the inventory

Japan ENCS : On the inventory, or in compliance with the inventory

Korea KECI : All substances in this product were registered, notified to be registered, or exempted from registration by CPChem through an Only Representative according to K-REACH regulations. Importation of this product is permitted if the Korean Importer of Record was included on CPChem's notifications or if the Importer of Record themselves notified the substances.

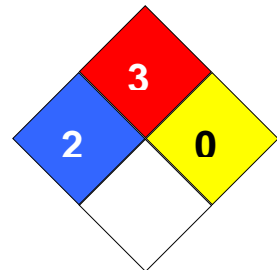
Philippines PICCS : On the inventory, or in compliance with the inventory

Taiwan TCSI : 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

**Further information**

Legacy SDS Number : 387250

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			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%

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AIIC	Australian Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%	ATE	Acute toxicity estimate

**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.

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

Main User Groups	:	<b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	<b>SU3, SU8, SU9:</b> Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	<b>PROC1:</b> Use in closed process, no likelihood of exposure <b>PROC3:</b> Use in closed batch process (synthesis or formulation) <b>PROC8b:</b> Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities <b>PROC15:</b> Use as laboratory reagent
Environmental release category	:	<b>ERC1, ERC4:</b> 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.

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

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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**

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.

**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.

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**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**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC1, ERC4	EUSES		Freshwater		0,0016 µg/L	0,000067
			Marine water		0,0001 µg/L	0,000059
			Freshwater		0,0044 µg/kg	0,00015

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			sediment			
			Marine sediment		0,0004 µg/kg	0,000131
			Air		0,0067 µg/m3	

ERC1: Manufacture of substances

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

**Workers/Consumers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
PROC1, CS15, CS54, CS57	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long-term – systemic	0,03 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,00
PROC1, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7 ppm	0,1
			Worker – dermal, long-term – systemic	0,03 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,14
PROC3, CS15, CS2, CS55	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,5 ppm	0,1
			Worker – dermal, long-term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,05
PROC8b, CS14, CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1 ppm	0,0
			Worker – dermal, long-term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,02

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**

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

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

Main User Groups	:	<b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	<b>SU3:</b> Industrial Manufacturing (all)
Process category	:	<b>PROC1:</b> Use in closed process, no likelihood of exposure <b>PROC2:</b> Use in closed, continuous process with occasional controlled exposure <b>PROC3:</b> Use in closed batch process (synthesis or formulation) <b>PROC4:</b> Use in batch and other process (synthesis) where opportunity for exposure arises <b>PROC8a:</b> Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities <b>PROC8b:</b> Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities : Transfer of substance or preparation into small containers (dedicated filling line, including weighing) <b>PROC15:</b> Use as laboratory reagent
Environmental release category	:	<b>ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7:</b> 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 m <sup>3</sup> /d
Dilution Factor (River)	:	10

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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**



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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**

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., 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****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)

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

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)

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**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**  
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**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC1, ERC2,	EUSES		Freshwater		0,0022 mg/L	0,0911

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ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7					
			Marine water	0,0003 mg/L	0,118
			Freshwater sediment	0,006 mg/kg	0,203
			Marine sediment	0,0008 mg/kg	0,263
			Air	0,0001 mg/m3	

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**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
PROC1, CS15, CS54, CS57	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long- term – systemic	0,03 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,00
PROC1, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7 ppm	0,1
			Worker – dermal, long- term – systemic	1,37 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,32
PROC2, CS15, CS54, CS56, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7 ppm	0,1
			Worker – dermal, long- term – systemic	1,37 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,32
PROC3, CS2, CS15, CS55	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,5 ppm	0,1
			Worker – dermal, long- term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,05
PROC4, CS16	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2 ppm	0,0
			Worker – dermal, long- term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,13
PROC8a, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long- term – systemic	1,371 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,28

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PROC8b, CS14, CS107	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19
PROC8b, CS108	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	35 ppm	0,7
			Worker – dermal, long-term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,79
PROC9, CS6	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19
PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1 ppm	0,0
			Worker – dermal, long-term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,02

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

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

CS16: General exposures (open systems)

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

CS39: Equipment cleaning and maintenance

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

CS14: Bulk transfers

CS107: (closed systems)

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

CS108: (open systems)

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

CS6: Drum and small package filling

PROC15: Use as laboratory reagent

CS36: Laboratory activities

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

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

Main User Groups	:	<b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	<b>SU3, SU 10:</b> Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process category	:	<p><b>PROC1:</b> Use in closed process, no likelihood of exposure</p> <p><b>PROC2:</b> Use in closed, continuous process with occasional controlled exposure</p> <p><b>PROC3:</b> Use in closed batch process (synthesis or formulation)</p> <p><b>PROC4:</b> Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>: PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p><b>PROC8a:</b> Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p><b>PROC8b:</b> Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p><b>PROC15:</b> Use as laboratory reagent</p>
Environmental release category	:	<b>ERC2:</b> 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 m <sup>3</sup> /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

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Soil : provide the required removal efficiency of  $\geq$  (%): (Effectiveness: 99,9 %)  
: 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**

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**

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

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**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**

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.



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**2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)****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: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-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., Drain down and flush system prior to equipment opening or maintenance.

**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**

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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**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC2	EUSES		Freshwater		0,0004 mg/L	0,177
			Marine water		0,0549 µg/L	0,0229
			Freshwater sediment		0,001 mg/kg	0,0394
			Marine sediment		0,0001 mg/kg	0,051
			Air		0,0008 mg/m3	
			Soil		0,0024 mg/kg	0,207

ERC2: Formulation of preparations

**Workers/Consumers**

Contributing	Exposure Assessment	Specific	Value type	Level of Exposure	Risk characterization
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Scenario	Method	conditions		ratio (PEC/PNEC):	
PROC1, CS15, CS54, CS57	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long- term – systemic	0,03 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,0
PROC1, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7 ppm	0,1
			Worker – dermal, long- term – systemic	1,37 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,32
PROC2, CS15, CS54, CS56, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7 ppm	0,1
			Worker – dermal, long- term – systemic	1,37 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,32
PROC3, CS2, CS15, CS55	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,5 ppm	0,1
			Worker – dermal, long- term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,05
PROC3, CS136	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	10 ppm	0,2
			Worker – dermal, long- term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,2
PROC4, CS16	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2 ppm	0,0
			Worker – dermal, long- term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,13
PROC9, CS6	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long- term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19
PROC5, CS30	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long- term – systemic	1,371 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,28
PROC8a, CS22, CS34, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long- term – systemic	1,371 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,28
PROC8b, CS8, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long- term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19

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PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1 ppm	0,0
			Worker – dermal, long-term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,02

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 preparations and articles (multistage and/ or significant contact)  
 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  
 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	:	<b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	<b>SU3:</b> Industrial Manufacturing (all)
Process category	:	<b>PROC1:</b> Use in closed process, no likelihood of exposure <b>PROC2:</b> Use in closed, continuous process with occasional controlled exposure <b>PROC3:</b> Use in closed batch process (synthesis or formulation) <b>PROC8a:</b> Transfer of substance or preparation

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

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 m<sup>3</sup>/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 ≥ (%): (Effectiveness: 99,9 %)

Remarks : Soil emission controls are not applicable as there is no direct release to soil.

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

Remarks : Wastewater emissions generated from equipment cleaning with water.

**Conditions and measures related to 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****Product characteristics**

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

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**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: 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., 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****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**

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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**

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****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**

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**Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC7	EUSES		Freshwater		0,0004 mg/L	0,0176
			Marine water		0,0548 µg/L	0,0228
			Freshwater sediment		0,0012 mg/kg	0,0393
			Marine sediment		0,015 µg/kg	0,0509
			Air		0,0008 mg/m3	
			Soil		0,0024 mg/kg	0,206

ERC7: Industrial use of substances in closed systems

**Workers/Consumers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
PROC1, CS15, CS38	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,0
			Worker – dermal, long-term – systemic	0,03 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,00
PROC1, PROC2, CS107, CS38, CS67	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1 ppm	0,0
			Worker – dermal, long-term – systemic	0,137 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,04
PROC3, CS15, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	2,5 ppm	0,1
			Worker – dermal, long-term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,05
PROC3, CS107, CS37	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	17,5 ppm	0,4
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,40
PROC8a, CS103, CS39	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	1,371 mg/kg/d	0,2
			Worker – long-term – systemic Combined routes		0,28
PROC8b, CS14	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	0,1372 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,12
PROC8b, CS8	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	5 ppm	0,1
			Worker – dermal, long-term – systemic	0,686 mg/kg/d	0,1
			Worker – long-term – systemic Combined routes		0,19



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PROC15, CS36	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1 ppm	0,0
			Worker – dermal, long- term – systemic	0,034 mg/kg/d	0,0
			Worker – long-term – systemic Combined routes		0,02

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 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.