# SAFETY DATA SHEET
According to EC No 1907/2006 as amended as at the date of this SDS

# MTBE

| Version | Revision Date: | SDS Number: | Date of last issue: - |
|---|---|---|---|
| 1.0 | 11.07.2025 | 800001003252 | Print Date 13.07.2025 |

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

### 1.1 Product identifier

| | | |
|---|---|---|
| Trade name | : | MTBE |
| Product code | : | X2113, X2939 |
| Registration number EU | : | 01-2119452786-27-0007, 01-2119452786-27-0008, 01-2119452786-27-0010, 01-2119452786-27-0011, 01-2119452786-27-0012 |
| Synonyms | : | 2 methoxy isobutane, Methyl tertiary butyl ether |
| CAS-No. | : | 1634-04-4 |

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

| | | |
|---|---|---|
| Use of the Substance/Mixture | : | Fuel additive component., Chemical feedstock and component of motor gasoline. For use only in industrial processes. Please refer to section 16 and/or the annexes for the registered uses under REACH. |
| Uses advised against | : | This product must not be used in applications other than the above without first seeking the advice of the supplier.<br><br>This product must not be used in applications other than those listed in Section 1 without first seeking the advice of the supplier. |

### 1.3 Details of the supplier of the safety data sheet

| | | |
|---|---|---|
| Manufacturer/Supplier | : | **Shell Chemicals Europe B.V.**<br>PO Box 2334<br>3000 CH Rotterdam<br>Netherlands |
| Telephone | : | +31 (0)10 441 5137 / +31 (0)10 441 5191 |
| Telefax | : | +31 (0)20 716 8316 / +31 (0)20 713 9230 |
| Contact for Safety Data Sheet | : | sccmsds@shell.com |

### 1.4 Emergency telephone number

+44 (0) 1235 239 670 (This telephone number is available 24 hours per day, 7 days per week)
Poison Centre: (+41) 145

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

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

| | |
|---|---|
| Flammable liquids, Category 2 | H225: Highly flammable liquid and vapour. |

| | |
|---|---|
| Skin irritation, Category 2 | H315: Causes skin irritation. |

### 2.2 Label elements

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

Hazard pictograms :

Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:
H225 Highly flammable liquid and vapour.
HEALTH HAZARDS:
H315 Causes skin irritation.
ENVIRONMENTAL HAZARDS:
Not classified as environmental hazard according to CLP criteria.

Precautionary statements :

**Prevention:**

P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**

P302 + P352 IF ON SKIN: Wash with plenty of water.

**Storage:**

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

**Disposal:**

P501 Dispose of contents/ container to an approved waste disposal plant.

### 2.3 Other hazards

Ecological information: 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.

Toxicological information: 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.

Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger.
May form explosive peroxides.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

**Components**

| Chemical name | CAS-No.<br>EC-No.<br>Index-No.<br>Registration number | Classification | Concentration (% w/w) |
|---|---|---|---|
| tert-butyl methyl ether | 1634-04-4<br>216-653-1<br>603-181-00-X<br>01-2119452786-27 | Flam. Liq. 2; H225<br>Skin Irrit. 2; H315 | <= 100 |

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : Not expected to be a health hazard when used under normal conditions.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

If inhaled : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.

In case of skin contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

In case of eye contact : Flush eye with copious quantities of water.
Remove contact lenses, if present and easy to do. Continue rinsing.
If persistent irritation occurs, obtain medical attention.

If swallowed : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Rinse mouth.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

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

Symptoms : Not considered to be an inhalation hazard under normal conditions of use.
Possible respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.

No specific hazards under normal use conditions.
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.

Ingestion may result in nausea, vomiting and/or diarrhoea.
If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

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

Treatment : Call a doctor or poison control center for guidance.
Potential for chemical pneumonitis.
Treat symptomatically.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Use foam, water fog for major fires.
Use dry chemical powder, carbon dioxide, sand or earth for minor fires.

Unsuitable extinguishing media : Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire.
Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

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

Specific hazards during fire-fighting : The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Carbon monoxide may be evolved if incomplete combustion occurs.

**5.3 Advice for firefighters**

| | | |
|---|---|---|
| Special protective equipment for firefighters | : | Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469). |
| Specific extinguishing methods | : | Standard procedure for chemical fires. |
| Further information | : | Clear fire area of all non-emergency personnel.<br>Keep adjacent containers cool by spraying with water. |

## SECTION 6: Accidental release measures

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

| | | |
|---|---|---|
| Personal precautions | : | Observe the relevant local and international regulations<br>Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.<br>Local authorities should be advised if significant spillages cannot be contained.<br>The vapour is heavier than air, spreads along the ground and distant ignition is possible.<br>Vapour may form an explosive mixture with air.<br>6.1.1 For non emergency personnel:<br>Avoid contact with skin, eyes and clothing.<br>Isolate hazard area and deny entry to unnecessary or unprotected personnel.<br>Do not breathe fumes, vapour.<br>Do not operate electrical equipment.<br>6.1.2 For emergency responders:<br>Avoid contact with skin, eyes and clothing.<br>Isolate hazard area and deny entry to unnecessary or unprotected personnel.<br>Do not breathe fumes, vapour.<br>Do not operate electrical equipment. |

**6.2 Environmental precautions**

| | | |
|---|---|---|
| Environmental precautions | : | Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures |

against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Ventilate contaminated area thoroughly.
Monitor area with combustible gas indicator.

**6.3 Methods and material for containment and cleaning up**

Methods for cleaning up : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely
For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

**6.4 Reference to other sections**

For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet., For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

Technical measures : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid contact with skin, eyes and clothing.
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Bulk storage tanks should be diked (bunded).
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.
Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.

Product Transfer : Refer to guidance under Handling section. Even with proper grounding and bonding, this material can still accumulate an

electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not ingest. If swallowed, then seek immediate medical assistance.

**7.2 Conditions for safe storage, including any incompatibilities**

Requirements for storage areas and containers : The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Further information on storage stability : Storage Temperature:
Ambient.

The storage of this product may be subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance may be obtained from the local environmental agency office.
Bulk storage tanks should be diked (bunded).
Locate tanks away from heat and other sources of ignition.
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel.
Unsuitable material: Natural, butyl, neoprene or nitrile rubbers.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

**7.3 Specific end use(s)**

Specific use(s) : Please refer to section 16 and/or the annexes for the registered uses under REACH.

Ensure that all local regulations regarding handling and storage facilities are followed.
See additional references that provide safe handling practices: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
IEC/TS 60079-32-1: Electrostatic hazards, guidance

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Occupational Exposure Limits**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---|---|---|---|---|
| tert-butyl methyl ether | 1634-04-4 | STEL | 75 ppm<br>270 mg/m3 | CH SUVA |
| | Further information: National Institute for Occupational Safety and Health, Harm to the unborn child is not to be expected when the OEL-value is respected | | | |
| tert-butyl methyl ether | | TWA | 50 ppm<br>180 mg/m3 | CH SUVA |
| | Further information: National Institute for Occupational Safety and Health, Harm to the unborn child is not to be expected when the OEL-value is respected | | | |

**Biological occupational exposure limits**

No biological limit allocated.

**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:**

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|---|---|---|---|---|
| tert-butyl methyl ether | Workers | Inhalation | Acute local effects | 357 mg/m3 |
| tert-butyl methyl ether | Workers | Dermal | Long-term systemic effects | 5100 mg/kg bw/day |
| tert-butyl methyl ether | Workers | Inhalation | Long-term systemic effects | 178,5 mg/m3 |

| | | | | |
|---|---|---|---|---|
| tert-butyl methyl ether | Consumers | Inhalation | Acute local effects | 214 mg/m3 |
| tert-butyl methyl ether | Consumers | Oral | Long-term systemic effects | 7,1 mg/kg bw/day |
| tert-butyl methyl ether | Consumers | Dermal | Long-term systemic effects | 3570 mg/kg bw/day |
| tert-butyl methyl ether | Consumers | Inhalation | Long-term systemic effects | 53,6 mg/m3 |

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

| Substance name | Environmental Compartment | Value |
|---|---|---|
| tert-butyl methyl ether | Fresh water | 5,1 mg/l |
| tert-butyl methyl ether | Sediment | 23 mg/kg dry weight (d.w.) |
| tert-butyl methyl ether | Soil | 1,43 mg/kg dry weight (d.w.) |
| tert-butyl methyl ether | Sewage treatment plant | 71 mg/l |

**8.2 Exposure controls**

**Engineering measures**

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.
Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Eye washes and showers for emergency use.
Firewater monitors and deluge systems are recommended.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:
General Information
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

**Personal protective equipment**

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.
The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

| | | |
|---|---|---|
| Eye protection | : | Wear goggles for use against liquids and gas.<br>Approved to EU Standard EN166.<br><br>If a local risk assessment deems it so then chemical splash goggles may not be required and safety glasses may provide adequate eye protection. |
| Hand protection | | |
| Remarks | : | Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Viton. Incidental contact/Splash protection: Nitrile rubber. PVC. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. |
| Skin and body protection | : | Chemical resistant gloves/gauntlets, boots, and apron.<br><br>Protective clothing approved to EU Standard EN14605. |
| Respiratory protection | : | If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.<br>Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.<br>If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [Type AX boiling point < 65°C (149°F)] meeting EN14387. |

Thermal hazards : Not applicable

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Physical state : liquid

Colour : Not applicable

Odour : Ethereal

Odour Threshold : 0,05 ppm

Melting / freezing point : -109 °C

Boiling point/boiling range : 55 °C

Flammability

Flammability (solid, gas) : Highly flammable liquid and vapour.

Lower explosion limit and upper explosion limit / flammability limit

Upper explosion limit / Upper flammability limit : 8 %(V)

Lower explosion limit / Lower flammability limit : 1 %(V)

Flash point : -28 °C

Auto-ignition temperature : 460 °C
Method: ASTM E-659

Decomposition temperature

Decomposition temperature : Data not available

pH : Not applicable

Viscosity

Viscosity, dynamic : 0,35 mPa.s (20 °C)
Method: ASTM D445

Viscosity, kinematic : 0,464 mm2/s (20 °C)
Method: ASTM D445

0,4 mm2/s (40 °C)
Method: ASTM D445

| | | |
|---|---|---|
| Solubility(ies) | | |
| Water solubility | : | 41.850 mg/l (20 °C) |
| Partition coefficient: n-octanol/water | : | log Pow: 1,06 (20 °C) |
| Vapour pressure | : | 25 kPa (20 °C) |
| | | 86 kPa (50 °C) |
| Relative density | : | 0,74 (20 °C)<br>Method: ASTM D4052 |
| Density | : | 740 - 745 kg/m3 (20 °C)<br>Method: ASTM D4052 |
| | | Typical 745,6 g/cm3 (15,0 °C)<br>Method: ASTM D4052 |
| Relative vapour density | : | 3,23 (20 °C) |
| Particle characteristics | | |
| Particle size | : | Data not available |

**9.2 Other information**

| | | |
|---|---|---|
| Explosive properties | : | Not applicable |
| Oxidizing properties | : | Data not available |
| Evaporation rate | : | 1,6<br>Method: DIN 53170, di-ethyl ether=1 |
| | | 8,4<br>Method: ASTM D 3539, nBuAc=1 |
| Conductivity | : | Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid |
| Surface tension | : | 19,3 mN/m, 25 °C |
| | | 18,1 mN/m, 40 °C |
| Molecular weight | : | 88,15 g/mol |

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Oxidises on contact with air to form unstable peroxides.

### 10.2 Chemical stability

No hazardous reaction is expected when handled and stored according to provisions

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Reacts with strong oxidising agents.

### 10.4 Conditions to avoid

Conditions to avoid : Avoid heat, sparks, open flames and other ignition sources.
Prevent vapour accumulation.
In certain circumstances product can ignite due to static electricity.

### 10.5 Incompatible materials

Materials to avoid : Strong oxidising agents.

### 10.6 Hazardous decomposition products

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
May form explosive peroxides.

## SECTION 11: Toxicological information

### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Information on likely routes of exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

**Acute toxicity**

**Components:**

**tert-butyl methyl ether:**

Acute oral toxicity : LD 50 (Rat, male and female): Method: OECD Test Guideline 401
Remarks: May be harmful if swallowed.

Acute inhalation toxicity : LC 50 (Rat, male and female): > 85 mg/l
Exposure time: 4 h

Test atmosphere: vapour
Method: Test(s) equivalent or similar to OECD Test Guideline 403
Remarks: Based on available data, the classification criteria are not met.

Acute dermal toxicity : LD 50 (Rat, male and female): > 2.000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on available data, the classification criteria are not met.

**Skin corrosion/irritation**

**Components:**

**tert-butyl methyl ether:**

Species : Rabbit
Method : OECD Test Guideline 404
Remarks : Irritating to skin.

**Serious eye damage/eye irritation**

**Components:**

**tert-butyl methyl ether:**

Species : Rabbit
Method : OECD Test Guideline 405
Remarks : Slightly irritating to the eye.
Based on available data, the classification criteria are not met.

**Respiratory or skin sensitisation**

**Components:**

**tert-butyl methyl ether:**

Species : Guinea pig
Method : Test(s) equivalent or similar to OECD Test Guideline 406
Remarks : Based on available data, the classification criteria are not met.

**Germ cell mutagenicity**

**Components:**

**tert-butyl methyl ether:**

Genotoxicity in vitro : Method: OECD Test Guideline 471
Remarks: Based on available data, the classification criteria are not met.

Method: Test(s) equivalent or similar to OECD Test Guideline 476
Remarks: Based on available data, the classification criteria

are not met.

Genotoxicity in vivo : Species: Mouse
Method: Test(s) equivalent or similar to OECD Test Guideline 486
Remarks: Based on available data, the classification criteria are not met.

Species: Mouse
Method: Other guideline method.
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity- Assessment : This product does not meet the criteria for classification in categories 1A/1B.

**Carcinogenicity**

**Components:**

**tert-butyl methyl ether:**

Species : Rat, male and female
Application Route : Inhalation
Method : Other guideline method.
Remarks : Based on available data, the classification criteria are not met.

Carcinogenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

| Material | GHS/CLP Carcinogenicity Classification |
|---|---|
| tert-butyl methyl ether | No carcinogenicity classification. |

| Material | Other Carcinogenicity Classification |
|---|---|
| tert-butyl methyl ether | IARC: Group 3: Not classifiable as to its carcinogenicity to humans |

**Reproductive toxicity**

**Components:**

**tert-butyl methyl ether:**

Effects on fertility : Species: Rat
Sex: male and female
Application Route: Inhalation

Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

**STOT - single exposure**

**Components:**

**tert-butyl methyl ether:**

Remarks : Based on available data, the classification criteria are not met.
Slightly irritating to respiratory system.
Vapours may cause drowsiness and dizziness.

**STOT - repeated exposure**

**Components:**

**tert-butyl methyl ether:**

Remarks : Based on available data, the classification criteria are not met.

**Repeated dose toxicity**

**Components:**

**tert-butyl methyl ether:**

| | | |
|---|---|---|
| Species | : | Rat, male and female |
| Application Route | : | Oral |
| Method | : | Test(s) equivalent or similar to OECD Test Guideline 408 |
| Target Organs | : | No specific target organs noted |

| | | |
|---|---|---|
| Species | : | Rat, male and female |
| Application Route | : | Inhalation |
| Test atmosphere | : | vapour |
| Method | : | Literature data |
| Target Organs | : | No specific target organs noted |

**Aspiration toxicity**

**Components:**

**tert-butyl methyl ether:**

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

**11.2 Information on other hazards**

**Endocrine disrupting properties**

**Product:**

Assessment : 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.

**Further information**

**Product:**

Remarks : Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

**Components:**

**tert-butyl methyl ether:**

Remarks : Classifications by other authorities under varying regulatory frameworks may exist.

## SECTION 12: Ecological information

### 12.1 Toxicity

**Components:**

**tert-butyl methyl ether:**

Toxicity to fish : LC50 (Menidia beryllina (Silverside)): 574 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l

Toxicity to daphnia and other aquatic invertebrates : EC50 (Americamysis bahia): 187 mg/l
Exposure time: 96 h
Method: Test(s) equivalent or similar to OECD Guideline 202
Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l

Toxicity to algae/aquatic plants : IC50 (Scenedesmus capricornutum (fresh water algae)): 103 mg/l
Exposure time: 96 h
Method: Test(s) equivalent or similar to OECD Test Guideline 201
Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l

Toxicity to microorganisms : EC10 (Pseudomonas putida): 710 mg/l
Exposure time: 18 h
Method: Test(s) equivalent or similar to OECD Guideline 209
Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l

Toxicity to fish (Chronic tox- : NOEC: 299 mg/l

| | | |
|---|---|---|
| icity) | | Exposure time: 31 d<br>Species: Pimephales promelas (fathead minnow)<br>Method: Test(s) equivalent or similar to OECD Guideline 210<br>Remarks: NOEC/NOEL > 100 mg/l |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : | 26 mg/l<br>Exposure time: 28 d<br>Species: Americamysis bahia<br>Method: Test(s) equivalent or similar to OECD Guideline 210<br>Remarks: NOEC/NOEL > 10 - <=100 mg/l |

### 12.2 Persistence and degradability

**Product:**

| | | |
|---|---|---|
| Biodegradability | : | Remarks: Not Persistent per IMO criteria.<br>International Oil Pollution Compensation (IOPC) Fund definition: "A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof." |

**Components:**

**tert-butyl methyl ether:**

| | | |
|---|---|---|
| Biodegradability | : | Biodegradation: 9,24 %<br>Exposure time: 28 d<br>Method: OECD Test Guideline 301D<br>Remarks: Not readily biodegradable. |

### 12.3 Bioaccumulative potential

**Components:**

**tert-butyl methyl ether:**

| | | |
|---|---|---|
| Bioaccumulation | : | Species: Cyprinus carpio (Carp)<br>Exposure time: 28 d<br>Bioconcentration factor (BCF): 1,5<br>Method: Test(s) equivalent or similar to OECD Test Guideline 305<br>Remarks: Does not bioaccumulate significantly. |

### 12.4 Mobility in soil

**Components:**

**tert-butyl methyl ether:**

| | | |
|---|---|---|
| Mobility | : | Remarks: Floats on water., If product enters soil, it will be highly mobile and may contaminate groundwater. |

### 12.5 Results of PBT and vPvB assessment

**Components:**

**tert-butyl methyl ether:**

Assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB..

### 12.6 Endocrine disrupting properties

**Product:**

Assessment : 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.

### 12.7 Other adverse effects

**Product:**

Additional ecological information : Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : Recover or recycle if possible.
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Do not dispose into the environment, in drains or in water courses.
Waste product should not be allowed to contaminate soil or water.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : Drain container thoroughly.
After draining, vent in a safe place away from sparks and fire.
Residues may cause an explosion hazard.
Do not, puncture, cut, or weld uncleaned drums.
Send to drum recoverer or metal reclaimer.

Local legislation
Remarks : EU Waste Disposal Code (EWC):
13 07 03* wastes of liquid fuels, other fuels (including mixtures).
Classification of waste is always the responsibility of the end user.
Disposal should be in accordance with applicable regional, national, and local laws and regulations.

## SECTION 14: Transport information

**14.1 UN number or ID number**

**ADN** : 2398

**ADR** : 2398

**RID** : 2398

**IMDG** : 2398

**IATA** : 2398

**14.2 UN proper shipping name**

**ADN** : METHYL TERT-BUTYL ETHER

**ADR** : METHYL TERT-BUTYL ETHER

**RID** : METHYL TERT-BUTYL ETHER

**IMDG** : METHYL TERT-BUTYL ETHER

**IATA** : METHYL tert-BUTYL ETHER

**14.3 Transport hazard class(es)**

**ADN** : 3

**ADR** : 3

**RID** : 3

**IMDG** : 3

**IATA** : 3

**14.4 Packing group**

**ADN**
Packing group : II
Classification Code : F1
Labels : 3
CDNI Inland Water Waste Agreement : NST 8191 MTBE (Methyl-t-butyl ether)

**ADR**
Packing group : II
Classification Code : F1
Hazard Identification Number : 33

Labels : 3

**RID**
Packing group : II
Classification Code : F1
Hazard Identification Number : 33
Labels : 3

**IMDG**
Packing group : II
Labels : 3

**IATA**
Packing group : II
Labels : 3

**14.5 Environmental hazards**

**ADN**
Environmentally hazardous : no

**ADR**
Environmentally hazardous : no

**RID**
Environmentally hazardous : no

**IMDG**
Marine pollutant : no

**14.6 Special precautions for user**

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

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

Pollution category : Z
Ship type : 3
Product name : Methyl tert butyl ether

**Additional Information** **:** Transport in bulk according to Annex II of Marpol and the IBC Code

## SECTION 15: Regulatory information

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

REACH - List of substances subject to authorisation (Annex XIV) : Product is not subject to Authorisation under REACH.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH),

Article 57).
Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
P5c FLAMMABLE LIQUIDS

Waters Protection Ordinance (WPO 814.201)
Water pollution class : Swiss Class A, (www.tankportal.ch)

**Other regulations:**
The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Product is subject to Stoerfallverordnung (StFV).

Compliance with the requirements of the Youth Employment Protection Ordinance (ArGV 5, SR 822.115) & Ordinance on Dangerous Labour for Young People (SR 822.115.2) must be ensured.
Take note of Law on the protection of mothers at work, in education and in studies (Maternity Protection Act – Mutterschutzverordnung).

**The components of this product are reported in the following inventories:**

| | | |
|---|---|---|
| AIIC | : | Listed |
| DSL | : | Listed |
| IECSC | : | Listed |
| ENCS | : | Listed |
| KECI | : | Listed |
| NZIoC | : | Listed |
| PICCS | : | Listed |
| TSCA | : | Listed |
| TCSI | : | Listed |

**15.2 Chemical safety assessment**
A Chemical Safety Assessment has been carried out for this substance.

## SECTION 16: Other information

**Full text of other abbreviations**

| | | |
|---|---|---|
| CH SUVA | : | Switzerland. Limit values at the work place |
| CH SUVA / TWA | : | Time Weighted Average |
| CH SUVA / STEL | : | Short Term Exposure Limit |

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

**Further information**

| | | |
|---|---|---|
| Training advice | : | Provide adequate information, instruction and training for operators. |
| Other information | : | For Industry guidance and tools on REACH please visit the CEFIC website at http://cefic.org/Industry-support.<br>The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.<br><br>A vertical bar (\|) in the left margin indicates an amendment from the previous version. |
| Sources of key data used to compile the Safety Data Sheet | : | The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc). |

**Classification of the mixture:** **Classification procedure:**

| | | |
|---|---|---|
| Flam. Liq. 2 | H225 | On basis of test data. |
| Skin Irrit. 2 | H315 | Expert judgement and weight of evidence determination. |

**Identified Uses according to the Use Descriptor System**
**Uses - Worker**
Title : Manufacture of substance
- Industrial

**Uses - Worker**
Title : Formulation & (re)packing of substances and mixtures
- Industrial

**Uses - Worker**
Title : Use as a fuel
- Industrial

**Uses - Worker**
Title : Use as a fuel
- Professional

**Identified Uses according to the Use Descriptor System**
**Uses - Consumer**
Title : Use as a fuel
- Consumer

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.

CH / EN

**Exposure Scenario - Worker**

| **300000000243** | |
|---|---|
| **SECTION 1** | **EXPOSURE SCENARIO TITLE** |
| **Title** | Manufacture of substance- Industrial |
| **Use Descriptor** | **Sector of Use**: SU 3<br>**Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15<br>**Environmental Release Categories**: ERC1, ERC4 |
| **Scope of process** | 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. |

| **SECTION 2** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
|---|---|
| **Section 2.1** | **Control of Worker Exposure** |
| **Product Characteristics** | |
| Physical form of product | Liquid, vapour pressure > 10 kPa at STP |
| Concentration of the Substance in Mixture/Article | Covers use of substance/product up to 100% (unless stated differently)., |
| **Frequency and Duration of Use** | |
| Covers daily exposures up to 8 hours (unless stated differently). | |
| **Other Operational Conditions affecting Exposure** | |
| Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. | |
| **Contributing Scenarios** | **Risk Management Measures** |
| General measures (skin irritants). | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. |
| General exposures (closed systems) | No other specific measures identified. |
| General exposures (closed systems)with sample collection | Ensure operation is undertaken outdoors. |
| General exposures (closed systems)Use in contained batch processeswith sample collection | Provide extraction ventilation at points where emissions occur. |
| General exposures (open | Ensure material transfers are under containment or extract |

| | |
|---|---|
| systems)Batch processwith sample collectionFilling/ preparation of equipment from drums or containers. | ventilation.<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Process sampling | Ensure material transfers are under containment or extract ventilation.<br>, or:<br>Avoid carrying out operation for more than 1 hour. |
| Laboratory activities | Handle in a fume cupboard or under extract ventilation. |
| Bulk open loading and unloading.Non-dedicated facility | Avoid carrying out activities involving exposure for more than 4 hours<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Bulk closed loading and unloading.Dedicated facility | Ensure material transfers are under containment or extract ventilation.<br>, or:<br>Avoid carrying out activities involving exposure for more than 4 hours |
| Equipment cleaning and maintenanceNon-dedicated facility | Drain down and flush system prior to equipment opening or maintenance.<br>Avoid carrying out activities involving exposure for more than 4 hours<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Storage.General exposures (closed systems)with sample collection | Store substance within a closed system.<br>Avoid carrying out activities involving exposure for more than 4 hours |

| **Section 2.2** | **Control of Environmental Exposure** |
|---|---|
| Substance is a unique structure. | |
| Predominantly hydrophobic. | |
| Readily biodegradable. | |
| **Amounts Used** | |
| Fraction of EU tonnage used in region: | 0,25 |
| Regional use tonnage (tonnes/year): | 290,000 |
| Fraction of Regional tonnage used locally: | 0,4 |
| Annual site tonnage (tonnes/year): | 116,000 |
| Maximum daily site tonnage (kg/day): | 386,667 |
| **Frequency and Duration of Use** | |
| Continuous release. | |
| Emission Days (days/year): | 300 |
| **Other Operational Conditions affecting Environmental Exposure** | |
| Release fraction to air from process (initial release prior to RMM): | 1,00E-03 |

| | |
|---|---|
| Release fraction to wastewater from process (initial release prior to RMM): | 3,00E-04 |
| Release fraction to soil from process (initial release prior to RMM): | 1,00E-04 |
| **Technical conditions and measures at process level (source) to prevent release** | |
| Common practices vary across sites thus conservative process release estimates used. | |
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** | |
| Prevent discharge of undissolved substance to or recover from onsite wastewater. | |
| Risk from environmental exposure is driven by soil. | |
| No air emission controls required; required removal efficiency is 0%. | |
| Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%) | 99 |
| Soil emission controls are not applicable as there is no direct release to soil. | |
| **Organisational measures to prevent/limit release from site** | |
| Do not apply industrial sludge to natural soils.<br>Sludge should be incinerated, contained or reclaimed. | |
| **Conditions and Measures related to municipal sewage treatment plant** | |
| Assumed domestic sewage treatment plant flow (m3/d) | 2.000 |
| **Conditions and Measures related to external treatment of waste for disposal** | |
| During manufacturing no waste of the substance is generated. | |
| **Conditions and measures related to external recovery of waste** | |
| During manufacturing no waste of the substance is generated. | |

| **SECTION 3** | **EXPOSURE ESTIMATION** |
|---|---|
| **Section 3.1 - Health** | |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.<br>For some of the Contributing Scenarios workplace exposures have been estimated from measured data. | |

| **Section 3.2 -Environment** |
|---|
| Used EUSES model. |

| **SECTION 4** | **GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO** |
|---|---|
| **Section 4.1 - Health** | |
| Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.<br>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.<br>Risk Management Measures are based on qualitative risk characterisation.<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. | |

| **Section 4.2 -Environment** |
|---|
| Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. |
| Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |
| Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. |

**Exposure Scenario - Worker**

| **300000000244** | |
|---|---|
| **SECTION 1** | **EXPOSURE SCENARIO TITLE** |
| **Title** | Formulation & (re)packing of substances and mixtures- Industrial |
| **Use Descriptor** | **Sector of Use**: SU 3<br>**Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15<br>**Environmental Release Categories**: ERC2 |
| **Scope of process** | Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. |

| **SECTION 2** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
|---|---|
| **Section 2.1** | **Control of Worker Exposure** |
| **Product Characteristics** | |
| Physical form of product | Liquid, vapour pressure > 10 kPa at STP |
| Concentration of the Substance in Mixture/Article | Covers use of substance/product up to 100% (unless stated differently)., |
| **Frequency and Duration of Use** | |
| Covers daily exposures up to 8 hours (unless stated differently). | |
| **Other Operational Conditions affecting Exposure** | |
| Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. | |
| **Contributing Scenarios** | **Risk Management Measures** |
| General measures (skin irritants). | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. |
| General exposures (closed systems) | No specific measures identified. |
| General exposures (closed systems)with sample collection | Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). |
| General exposures (closed systems)Use in contained batch processeswith sample collection | Provide extraction ventilation at points where emissions occur. |

| | |
|---|---|
| General exposures (open systems)Batch processwith sample collectionFilling/ preparation of equipment from drums or containers. | Provide extraction ventilation at points where emissions occur. |
| General exposures (closed systems)Batch processes at elevated temperatureswith sample collection | Formulate in enclosed or ventilated mixing vessels.<br>Provide extraction ventilation at points where emissions occur. |
| Process sampling | Provide extraction ventilation at points where emissions occur. |
| Laboratory activities | Handle in a fume cupboard or under extract ventilation. |
| Bulk transfers | Ensure material transfers are under containment or extract ventilation. |
| Mixing operations (open systems)Batch process | Provide extraction ventilation at points where emissions occur. |
| ManualTransfer from/pouring from containersNon-dedicated facility | Ensure material transfers are under containment or extract ventilation. |
| Drum/batch transfersDedicated facility | Use drum pumps.<br>Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. |
| Drum and small package fillingDedicated facility | Fill containers/cans at dedicated filling points supplied with local extract ventilation. |
| Equipment cleaning and maintenanceNon-dedicated facility | Drain down and flush system prior to equipment opening or maintenance.<br>Avoid carrying out activities involving exposure for more than 4 hours<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Storage.General exposures (closed systems)with sample collection | Store substance within a closed system.<br>Avoid carrying out activities involving exposure for more than 4 hours |

| **Section 2.2** | **Control of Environmental Exposure** |
|---|---|
| Substance is a unique structure. | |
| Predominantly hydrophobic. | |
| Readily biodegradable. | |
| **Amounts Used** | |
| Fraction of EU tonnage used in region: | 0,57 |
| Regional use tonnage (tonnes/year): | 659,000 |
| Fraction of Regional tonnage used locally: | 0,05 |
| Annual site tonnage (tonnes/year): | 32,950 |

| | |
|---|---|
| Maximum daily site tonnage (kg/day): | 109,833 |
| **Frequency and Duration of Use** | |
| Continuous release. | |
| Emission Days (days/year): | 300 |
| **Other Operational Conditions affecting Environmental Exposure** | |
| Release fraction to air from process (initial release prior to RMM): | 1,00E-03 |
| Release fraction to wastewater from process (initial release prior to RMM): | 3,00E-04 |
| Release fraction to soil from process (initial release prior to RMM): | 1,00E-04 |
| **Technical conditions and measures at process level (source) to prevent release** | |
| Common practices vary across sites thus conservative process release estimates used. | |
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** | |
| Prevent discharge of undissolved substance to or recover from onsite wastewater. | |
| Risk from environmental exposure is driven by soil. | |
| No air emission controls required; required removal efficiency is 0%. | |
| Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%) | 99 |
| Soil emission controls are not applicable as there is no direct release to soil. | |
| **Organisational measures to prevent/limit release from site** | |
| Do not apply industrial sludge to natural soils.<br>Sludge should be incinerated, contained or reclaimed. | |
| **Conditions and Measures related to municipal sewage treatment plant** | |
| Assumed domestic sewage treatment plant flow (m3/d) | 2.000 |
| **Conditions and Measures related to external treatment of waste for disposal** | |
| Not applicable. | |
| **Conditions and measures related to external recovery of waste** | |
| Not applicable. | |

| **SECTION 3** | **EXPOSURE ESTIMATION** |
|---|---|
| **Section 3.1 - Health** | |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.<br>For some of the Contributing Scenarios workplace exposures have been estimated from measured data. | |

| **Section 3.2 -Environment** |
|---|
| Used EUSES model. |

| **SECTION 4** | **GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO** |
|---|---|
| **Section 4.1 - Health** | |
| Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management | |

| |
|---|
| Measures/Operational Conditions outlined in Section 2 are implemented.<br>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.<br>Risk Management Measures are based on qualitative risk characterisation.<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. |

| **Section 4.2 -Environment** |
|---|
| Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. |
| Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |
| Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. |

**Exposure Scenario - Worker**

| **300000000245** | |
|---|---|
| **SECTION 1** | **EXPOSURE SCENARIO TITLE** |
| **Title** | Use as a fuel- Industrial |
| **Use Descriptor** | **Sector of Use**: SU 3<br>**Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16<br>**Environmental Release Categories**: ERC7, ESVOC SpERC 7.12a.v1 |
| **Scope of process** | Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste. |

| **SECTION 2** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
|---|---|
| **Section 2.1** | **Control of Worker Exposure** |
| **Product Characteristics** | |
| Physical form of product | Liquid, vapour pressure > 10 kPa at STP |
| Concentration of the Substance in Mixture/Article | Limit the substance content in the product to 10 %., |
| **Frequency and Duration of Use** | |
| Covers daily exposures up to 8 hours (unless stated differently). | |
| **Other Operational Conditions affecting Exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented. | |
| **Contributing Scenarios** | **Risk Management Measures** |
| General measures (skin irritants). | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. |
| Bulk transfers | Ensure material transfers are under containment or extract ventilation. |
| Drum/batch transfersFilling/ preparation of equipment from drums or containers. | Use drum pumps. |
| General exposures (closed systems)Continuous processwith sample collection | No other specific measures identified. |
| General exposures (closed systems)Use in contained batch processeswith sam- | Avoid carrying out activities involving exposure for more than 4 hours<br>, or: |

| | |
|---|---|
| ple collection | Wear a respirator conforming to EN140 with Type A filter or better. |
| Use as a fuel(closed systems) | No specific measures identified. |
| Equipment cleaning and maintenanceNon-dedicated facility | Drain down and flush system prior to equipment opening or maintenance.<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Storage.General exposures (closed systems)with sample collection | Store substance within a closed system.<br>Ensure operation is undertaken outdoors. |
| **Section 2.2** | **Control of Environmental Exposure** |

| | |
|---|---|
| Substance is a unique structure. | |
| Predominantly hydrophobic. | |
| Readily biodegradable. | |
| **Amounts Used** | |
| Fraction of EU tonnage used in region: | 0,57 |
| Regional use tonnage (tonnes/year): | 659,000 |
| Fraction of Regional tonnage used locally: | 0,02 |
| Annual site tonnage (tonnes/year): | 13,180 |
| Maximum daily site tonnage (kg/day): | 37,657 |
| **Frequency and Duration of Use** | |
| Continuous release. | |
| Emission Days (days/year): | 350 |
| **Other Operational Conditions affecting Environmental Exposure** | |
| Release fraction to air from process (initial release prior to RMM): | 1,00E-04 |
| Release fraction to wastewater from process (initial release prior to RMM): | 1,00E-05 |
| Release fraction to soil from process (initial release prior to RMM): | 1,00E-05 |
| **Technical conditions and measures at process level (source) to prevent release** | |
| Common practices vary across sites thus conservative process release estimates used. | |
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** | |
| Prevent discharge of undissolved substance to or recover from onsite wastewater. | |
| Risk from environmental exposure is driven by marine water. | |
| No air emission controls required; required removal efficiency is 0%. | |
| Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%) | 95 |
| Soil emission controls are not applicable as there is no direct release to soil. | |
| **Organisational measures to prevent/limit release from site** | |
| Do not apply industrial sludge to natural soils.<br>Sludge should be incinerated, contained or reclaimed. | |
| **Conditions and Measures related to municipal sewage treatment plant** | |
| Assumed domestic sewage treatment plant flow (m3/d) | 2.000 |

| **Conditions and Measures related to external treatment of waste for disposal** |
|---|
| Not applicable. |
| **Conditions and measures related to external recovery of waste** |
| Not applicable. |

| **SECTION 3** | **EXPOSURE ESTIMATION** |
|---|---|
| **Section 3.1 - Health** | |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. | |

| **Section 3.2 -Environment** |
|---|
| Used EUSES model. |

| **SECTION 4** | **GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO** |
|---|---|
| **Section 4.1 - Health** | |
| Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.<br>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.<br>Risk Management Measures are based on qualitative risk characterisation.<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. | |

| **Section 4.2 -Environment** |
|---|
| Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. |
| Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |
| Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. |
| Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org). |

**Exposure Scenario - Worker**

| **300000000249** | |
|---|---|
| **SECTION 1** | **EXPOSURE SCENARIO TITLE** |
| **Title** | Use as a fuel- Professional |
| **Use Descriptor** | **Sector of Use**: SU 22<br>**Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 9, PROC 16<br>**Environmental Release Categories**: ERC9a, ERC9b, ESVOC SpERC 9.12b.v1 |
| **Scope of process** | Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste. |

| **SECTION 2** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
|---|---|
| **Section 2.1** | **Control of Worker Exposure** |
| **Product Characteristics** | |
| Physical form of product | Liquid, vapour pressure > 10 kPa at STP |
| Concentration of the Substance in Mixture/Article | Limit the substance content in the product to 10 %., |
| **Frequency and Duration of Use** | |
| Covers daily exposures up to 8 hours (unless stated differently). | |
| **Other Operational Conditions affecting Exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented. | |
| **Contributing Scenarios** | **Risk Management Measures** |
| General measures (skin irritants). | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. |
| Bulk transfers | Ensure material transfers are under containment or extract ventilation. |
| Refueling. | Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). |
| Drum and small package fillingDedicated facility | Use drum pumps.<br>Avoid carrying out activities involving exposure for more than 1 hour.<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |

| | |
|---|---|
| Use as a fuel(closed systems) | No specific measures identified. |
| Equipment cleaning and maintenanceNon-dedicated facility | Drain down system prior to equipment opening or maintenance.<br>Avoid carrying out activities involving exposure for more than 4 hours<br>, or:<br>Wear a respirator conforming to EN140 with Type A filter or better. |
| Storage.General exposures (closed systems) | Store substance within a closed system.<br>No other specific measures identified. |

| **Section 2.2** | **Control of Environmental Exposure** |
|---|---|
| Substance is a unique structure. | |
| Predominantly hydrophobic. | |
| Readily biodegradable. | |
| **Amounts Used** | |
| Maximum daily site tonnage (kg/day): | 3,61 |
| **Frequency and Duration of Use** | |
| Dispersive use. | |
| Emission Days (days/year): | 365 |
| **Other Operational Conditions affecting Environmental Exposure** | |
| Release fraction to air from wide dispersive use (regional only): | 1,00E-02 |
| Release fraction to wastewater from wide dispersive use: | 1,00E-05 |
| Release fraction to soil from wide dispersive use (regional only): | 1,00E-05 |
| **Technical conditions and measures at process level (source) to prevent release** | |
| Common practices vary across sites thus conservative process release estimates used. | |
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** | |
| Risk from environmental exposure is driven by soil. | |
| No air emission controls required; required removal efficiency is 0%. | |
| Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%) | 37 |
| No soil emission controls required; required removal efficiency is 0% | |
| **Conditions and Measures related to municipal sewage treatment plant** | |
| Assumed domestic sewage treatment plant flow (m3/d) | 2.000 |
| **Conditions and Measures related to external treatment of waste for disposal** | |
| Not applicable. | |
| **Conditions and measures related to external recovery of waste** | |
| Not applicable. | |

| **SECTION 3** | **EXPOSURE ESTIMATION** |
|---|---|
| **Section 3.1 - Health** | |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. | |

| **Section 3.2 -Environment** |
|---|
| Used EUSES model. |

| **SECTION 4** | **GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO** |
|---|---|

| **Section 4.1 - Health** |
|---|
| Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.<br>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.<br>Risk Management Measures are based on qualitative risk characterisation.<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. |

| **Section 4.2 -Environment** |
|---|
| Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. |
| Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |
| Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. |
| Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org). |

**Exposure Scenario - Consumer**

| **300000001006** | |
|---|---|
| **SECTION 1** | **EXPOSURE SCENARIO TITLE** |
| **Title** | Use as a fuel - Consumer |
| **Use Descriptor** | **Sector of Use**: SU 21<br>**Product Categories**: PC13<br>**Environmental Release Categories**: ERC9a, ERC9b, ESVOC SpERC 9.12c.v1 |
| **Scope of process** | Covers consumer uses of automotive fuels only. |

| **SECTION 2** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
|---|---|
| **Section 2.1** | **Control of Consumer Exposure** |
| **Product Characteristics** | |
| Physical form of product | Liquid, vapour pressure > 10 Pa |
| Concentration of the Substance in Mixture/Article | Limit the substance content in the product to 10 %. |
| **Amounts Used** | |
| Unless stated otherwise. | |
| For each use event, covers amount up to (l): | 60 |
| **Frequency and Duration of Use** | |
| Unless stated otherwise. | |
| covers use up to (times/day of use): | 0,43 |
| **Other Operational Conditions affecting Exposure** | |
| Unless stated otherwise.<br>Covers use at ambient temperatures. | |
| **Product Categories** | **OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES** |
| Fuels Liquid: Automotive Refuelling. Liquid Scooter Refuelling. Liquid: Garden Equipment - Refuelling. | covers use up to 150 day/year |
| | covers use up to 1 times/day of use |
| | Covers exposure up to 0,25 hours/event |

| **Section 2.2** | **Control of Environmental Exposure** |
|---|---|
| Substance is a unique structure. | |
| Predominantly hydrophobic. | |
| Readily biodegradable. | |
| **Amounts Used** | |
| Maximum daily site tonnage (kg/day): | 3,61 |
| **Frequency and Duration of Use** | |
| Dispersive use. | |
| Emission Days (days/year): | 365 |

| **Other Operational Conditions affecting Environmental Exposure** | |
|---|---|
| Release fraction to air from wide dispersive use (regional only): | 1,00E-02 |
| Release fraction to wastewater from wide dispersive use: | 1,00E-05 |
| Release fraction to soil from wide dispersive use (regional only): | 1,00E-05 |
| **Conditions and Measures related to municipal sewage treatment plant** | |
| Assumed domestic sewage treatment plant flow (m3/d) | 2.000 |
| **Conditions and Measures related to external treatment of waste for disposal** | |
| Not applicable. | |
| **Conditions and measures related to external recovery of waste** | |
| Not applicable. | |

| **SECTION 3** | **EXPOSURE ESTIMATION** |
|---|---|
| **Section 3.1 - Health** | |
| The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated. | |

| **Section 3.2 -Environment** |
|---|
| Used EUSES model. |

| **SECTION 4** | **GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO** |
|---|---|
| **Section 4.1 - Health** | |
| Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. | |

| **Section 4.2 -Environment** |
|---|
| Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. |
| Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |
| Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. |
| Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org). |