# SAFETY DATA SHEET

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2020/878

# LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL)

**SDS # :**C3DVPSGMC

**previous revision date** : 2024/07/12

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

### 1.1 Product identifier

**Product name** : LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL)

**UFI** : 3FG0-QN4T-X800-M525

**Other means of identification** : RMG 380 with FAME

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

| Identified uses |
|---|
| Fuel used in marine applications : diesel engines and boilers.<br>Formulation & (re)packing of substances and mixtures - Industrial<br>Use as a fuel - Industrial<br>Use as a fuel - Professional |

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

TotalEnergies Marine Fuels Pte Ltd
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Tel: e +31 (0) 70-3180480
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**Contact**

H.S.E

### 1.4 Emergency telephone number

**National advisory body/Poison Center**

**Telephone number** : National Poison Information Center (NVIC): +31 (0) 88 755 8000 (Only intended to inform professional care providers in case of acute poisoning)

**Supplier**

**Telephone number** : Emergency phone: +44 1235 239670

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**Product definition** : Mixture

**Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

Acute Tox. 4, H332
Muta. 2, H341
Carc. 1B, H350
Repr. 2, H361d
STOT RE 2, H373 (blood, liver, thymus)
Aquatic Acute 1, H400
Aquatic Chronic 1, H410

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

For more details about adverse physical, human health and environmental effects, see sections 9 to 12.

### 2.2 Label elements

**Hazard pictograms** :

**Signal word** : Danger

**Hazard statements** : H332 - Harmful if inhaled.
H341 - Suspected of causing genetic defects.
H350 - May cause cancer.
H361d - Suspected of damaging the unborn child.
H373 - May cause damage to organs through prolonged or repeated exposure. (blood, liver, thymus)
H410 - Very toxic to aquatic life with long lasting effects.

**Precautionary statements**

**Prevention** : P201 - Obtain special instructions before use.
P280 - Wear protective gloves, protective clothing and eye or face protection.
P260 - Do not breathe gas, vapor or spray.
P273 - Avoid release to the environment.

**Response** : P308 + P313 - IF exposed or concerned: Get medical advice or attention.

**Storage** : Not applicable.

**Disposal** : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Contains** : Fuel oil, residual

**Supplemental label elements** : Repeated exposure may cause skin dryness or cracking.

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Restricted to professional users.

### 2.3 Other hazards

This mixture does not contain any substances that are assessed to be a PBT or a vPvB in a concentration >= 0,1 %. This product does not contain any substance present at a concentration equal to or greater than 0.1% by mass, included in the list drawn up in accordance with article 59, paragraph 1 of the REACh Regulation, due to its endocrine disrupting properties, or a substance known to have endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation 2018/605.

**Other hazards which do not result in classification** : Contact with hot material causes thermal skin burns.
Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations

Vapors may form explosive mixtures with air.
Hazard of slipping on spilled product.
Vapor may be irritating to eyes and respiratory system.

## SECTION 3: Composition/information on ingredients

**3.2 Mixtures** : Mixture

| Product/substance | Identifiers | % (w/w) | Classification | Specific Conc. Limits, M-factors and ATEs | Type |
|---|---|---|---|---|---|
| Fuel oil, residual | REACH #: 01-2119474894-22<br>EC: 270-675-6<br>CAS: 68476-33-5 | ≥10 | Acute Tox. 4, H332<br>Muta. 2, H341 (dermal)<br>Carc. 1B, H350<br>Repr. 2, H361d<br>STOT RE 2, H373 (blood, liver, thymus)<br>Aquatic Acute 1, H400<br>Aquatic Chronic 1, H410<br>EUH066<br>**See Section 16 for the full text of the H statements declared above.** | ATE [Inhalation (dusts and mists)] = 4.1 mg/l<br>M [Acute] = 1<br>M [Chronic] = 1 | [1] |

**Additional information** : Contains: Mixture of C16-C18 fatty acids methyl esters
Contains: Sulphur, or Sulfur
Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations
Component: % (v/v)

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

[1] Substance classified with a health or environmental hazard

Occupational exposure limits, if available, are listed in Section 8.

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

| | | |
|---|---|---|
| **Inhalation** | : | Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that vapors are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| **Skin contact** | : | Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| **Ingestion** | : | Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person.<br>If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| **Protection of first-aiders** | : | No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. |

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

**Over-exposure signs/symptoms**

| | | |
|---|---|---|
| **Eye contact** | : | Vapor may be irritating to eyes and respiratory system.<br>May cause mild reversible eye irritation.<br>watering<br>redness<br>Risk of burns ( if the product is hot) |
| **Inhalation** | : | respiratory tract irritation<br>Can cause central nervous system (CNS) depression.<br>nausea or vomiting<br>headache<br>drowsiness/fatigue<br>dizziness/vertigo<br>Intoxication (Hydrogen sulphide) |
| **Skin contact** | : | Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/ or dermatitis.<br>Risk of burns ( if the product is hot) |
| **Ingestion** | : | Not an expected route of exposure.<br>nausea or vomiting<br>stomach pains<br>diarrhea |

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

| | | |
|---|---|---|
| **Notes to physician** | : | Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |
| **Specific treatments** | : | No specific treatment. |

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media** : on small fires:
Use dry chemical, $CO_2$, alcohol-resistant foam or water spray (fog). Sand.
large fires:
Foam, Water fog (trained personnel only)

**Unsuitable extinguishing media** : Do not use a solid water stream as it may scatter and spread 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

**Hazards from the substance or mixture** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Hazardous combustion products** : Carbon dioxide ($CO_2$).
carbon monoxide
sulfur oxides ($SO_2$, $SO_3$ etc.)
fumes

### 5.3 Advice for firefighters

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
Gloves made of PVA are not water-resistant, and are not suitable for emergency use

**Additional information** : Not considered explosive based on chemical structure and oxygen balance considerations

## SECTION 6: Accidental release measures

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

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
Product may release hydrogen sulphide: a specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water and unintentional releases should be made to help determine controls appropriate to local circumstances.

Hazard of slipping on spilled product.

| | | |
|---|---|---|
| **For emergency responders** | : | Gloves made of PVA are not water-resistant, and are not suitable for emergency use<br>See Section 8 of the safety data sheet (personal protective equipment). See also the information in "For non-emergency personnel".<br>In an emergency or for exceptional short-lasting jobs in an atmosphere polluted by the product, it is necessary to wear protective respiratory equipment.: Self-contained breathing apparatus. |
| **6.2 Environmental precautions** | : | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. Collect spillage. |

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

| | | |
|---|---|---|
| **Small spill** | : | Stop leak if without risk. Move containers from spill area. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. |
| **Large spill** | : | Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. |
| **6.4 Reference to other sections** | : | See Section 1 for emergency contact information.<br>See Section 8 for information on appropriate personal protective equipment.<br>See Section 13 for additional waste treatment information. |

## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

| | | |
|---|---|---|
| **Protective measures** | : | Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. |
| **Advice on general occupational hygiene** | : | Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures. |

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

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

If the working temperature is higher than the flash point : Ground and bond container and receiving equipment.

Keep in a bunded area

**Seveso Directive - Reporting thresholds**

**Named substances**

| Name | Notification and MAPP threshold | Safety report threshold |
|---|---|---|
| Fuel - Category 34 | 2500 tonne | 25000 tonne |

### 7.3 Specific end use(s)

**Recommendations** : See exposure scenarios

**Industrial sector specific solutions** : Not available.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Occupational exposure limits**

No exposure limit value known.

**Biological Limit Values (BLV)**

No exposure indices known.

**Recommended monitoring procedures** : Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

**Advisory OEL** : Hydrogen sulphide (EU): OEL = 7 mg/m3, 5ppm (8 h), 14 mg/m3, 10ppm (short-time). (US) ACGIH: TLV-TWA = 1ppm, 1.4 mg/m3/ TLV-STEL = 5ppm, 7mg/m3. NIOSH: REL = 10ppm, 10 minute ceiling. IDHL = 100ppm

**DNELs/DMELs**

| Product/substance | Type | Exposure | Value | Population | Effects |
|---|---|---|---|---|---|
| Fuel oil, residual | DNEL | Long term Oral | 0.015 mg/kg bw/day | General population | Systemic |
| | DNEL | Long term Dermal | 0.065 mg/kg bw/day | Workers | Systemic |
| | DNEL | Long term Inhalation | 0.18 mg/m³ | Workers | Systemic |
| | DNEL | Short term Inhalation | 4716.8 mg/m³ | Workers | Systemic |

**PNECs**

| Product/ingredient name | Compartment Detail | Name | Method Detail |
|---|---|---|---|
| Fuel oil, residual | Secondary Poisoning | 66.7 mg/kg | - |

### 8.2 Exposure controls

**Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Individual protection measures**

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Work helmet with face shield and neck cloth (full head protection) Tightly-fitting goggles.

**Skin protection**

**Hand protection** : Hydrocarbon-proof gloves for aromatic hydrocarbons.
Glove material: nitrile rubber, neoprene rubber
Wear suitable gloves tested to EN374.
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.

**Body protection** : disposable overall Chemical-resistant protective suit.
Non-skid safety shoes or boots Wear rubber boots.

**Respiratory protection** : Maintain adequate ventilation
Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator with combination filter for vapor/particulate Type A/P2
To enter tankers, tanks, reservoirs where the oxygen content is too low, wear insulating respiratory apparatus
Approved respiratory protection equipment shall be used in spaces where hydrogen sulphide may accumulate: full face mask with cartridge/filter type “B” (grey for inorganic vapours including H2S) or self-contained breathing apparatus (SCBA). (EN 529)
The use of breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## SECTION 9: Physical and chemical properties

**The conditions of measurement of all properties are at standard temperature (20°C / 68°F) and pressure (1013 hPa) unless otherwise indicated**

### 9.1 Information on basic physical and chemical properties

**Appearance**

**Physical state** : Liquid. [Viscous]

**Color** : Brown. to dark green or dark brown to Black.

**Odor** : Hydrocarbon-like

**pH** : Not applicable. Product is non-soluble (in water).

**Melting point/freezing point** : Not available.

**Initial boiling point and boiling range** : 160 to 750°C [EN 15199]

| | | |
|---|---|---|
| **Flash point** | : | Closed cup: >60°C [ASTM D 93] |
| **Flammability** | : | Not available. |
| **Lower and upper explosion limit** | : | Lower: 0.5%<br>Upper: 5% |
| **Vapor pressure** | : | Not available. |
| **Vapor density** | : | >5 [Air = 1] |
| **Relative density** | : | 0.84 to 1.1 [ISO 12185] |
| **Density** | : | 0.84 to 1.1 g/cm³ [15°C] [ISO 12185] |
| **Solubility(ies)** | : | |

| Media | Result |
|---|---|
| water | Not soluble |

| | | |
|---|---|---|
| **Miscible with water** | : | No. |
| **Partition coefficient: n-octanol/ water** | : | Not applicable. |
| **Auto-ignition temperature** | : | 220 to 550°C [DIN 51794] |
| **Decomposition temperature** | : | Not available. |
| **Viscosity** | : | Dynamic (room temperature): Not available.<br>Kinematic (room temperature): Not available.<br>Kinematic (40°C): 30 to 700 $mm^2/s$ [ISO 3104] |

**Particle characteristics**

| | | |
|---|---|---|
| **Median particle size** | : | Not applicable. |

**9.2 Other information**

| | | |
|---|---|---|
| **Explosive properties** | : | Not considered explosive based on chemical structure and oxygen balance considerations |
| **Oxidizing properties** | : | This product is not considered oxidising based on chemical structure considerations |

## SECTION 10: Stability and reactivity

| | | |
|---|---|---|
| **10.1 Reactivity** | : | No specific test data related to reactivity available for this product or its ingredients. |
| **10.2 Chemical stability** | : | Stable under recommended storage and handling conditions (see Section 7). |
| **10.3 Possibility of hazardous reactions** | : | Under normal conditions of storage and use, hazardous reactions will not occur. |
| **10.4 Conditions to avoid** | : | heat, open flames, sparks and static discharge |
| **10.5 Incompatible materials** | : | strong acids<br>Strong oxidizing agents<br>Halogens |

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

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

**Acute toxicity**

| Product/substance | Result | Species | Dose | Exposure | Test |
|---|---|---|---|---|---|
| Fuel oil, residual | LC50 Inhalation Dusts and mists | Rat - Male, Female | 4.1 mg/l | 4 hours | OECD 403 |
| | LD50 Dermal | Rabbit - Male, Female | >2000 mg/kg | - | OECD 434 |
| | LD50 Oral | Rat | 4320 mg/kg | - | OECD 401 |

**Acute toxicity estimates**

| Product/substance | Oral (mg/kg) | Dermal (mg/kg) | Inhalation (gases) (ppm) | Inhalation (vapors) (mg/l) | Inhalation (dusts and mists) (mg/l) |
|---|---|---|---|---|---|
| LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL) | N/A | N/A | N/A | N/A | 4.6 |
| Fuel oil, residual | 4320 | N/A | N/A | N/A | 4.1 |

**Conclusion/Summary** : Based on available data, the classification criteria are met.

**Irritation/Corrosion**

**Conclusion/Summary**

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

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

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

**Sensitization**

**Conclusion/Summary**

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

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

**Mutagenicity**

**Conclusion/Summary** : Based on available data, the classification criteria are met.

**Carcinogenicity**

| Product/substance | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| Fuel oil, residual | Positive - Dermal - TD | Mouse | - | - |

**Conclusion/Summary** : Based on available data, the classification criteria are met.

**Reproductive toxicity**

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

**Teratogenicity**

| Product/substance | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| Fuel oil, residual | Positive - Dermal | Rat | - | - |

**Conclusion/Summary** : Based on available data, the classification criteria are met.

**Specific target organ toxicity (single exposure)**

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

**Specific target organ toxicity (repeated exposure)**

| Product/substance | Category | Route of exposure | Target organs |
|---|---|---|---|
| Fuel oil, residual | Category 2 | - | blood, liver, thymus |

**Conclusion/Summary** : Based on available data, the classification criteria are met.

**Aspiration hazard**

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

**Information on the likely routes of exposure** : Not available.

**Potential acute health effects**

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : Harmful if inhaled.

**Skin contact** : Defatting to the skin. May cause skin dryness and irritation.

**Ingestion** : No known significant effects or critical hazards.

**Symptoms related to the physical, chemical and toxicological characteristics**

**Eye contact** : Vapor may be irritating to eyes and respiratory system.
May cause mild reversible eye irritation.
watering
redness
Risk of burns ( if the product is hot)

**Inhalation** : respiratory tract irritation
Can cause central nervous system (CNS) depression.
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
Intoxication (Hydrogen sulphide)

**Skin contact** : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
Risk of burns ( if the product is hot)

**Ingestion** : Not an expected route of exposure.
nausea or vomiting
stomach pains
diarrhea

**Delayed and immediate effects and also chronic effects from short and long term exposure**

**Short term exposure**

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

**Long term exposure**

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

**Potential chronic health effects**

| Product/substance | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| Fuel oil, residual | Sub-chronic NOAEL Dermal | Rat | 1 mg/kg Read across | - |

**Conclusion/Summary** : Not available.

**General** : May cause damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

**Carcinogenicity** : May cause cancer.

**Mutagenicity** : Suspected of causing genetic defects.

**Reproductive toxicity** : Suspected of damaging the unborn child.

### 11.2 Information on other hazards

#### 11.2.1 Endocrine disrupting properties

This product does not contain any substance present at a concentration equal to or greater than 0.1% by mass, included in the list drawn up in accordance with article 59, paragraph 1 of the REACh Regulation, due to its endocrine disrupting properties, or a substance known to have endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation 2018/605.

#### 11.2.2 Other information

Not available.

## SECTION 12: Ecological information

Very toxic to aquatic life with long lasting effects.

### 12.1 Toxicity

| Product/substance | Result | Species | Exposure | Test |
|---|---|---|---|---|
| Fuel oil, residual | Acute EL50 0.32 mg/l Fresh water | Algae - *Pseudokirchnerella subcapitata* | 72 hours | OECD 201 |
| | Acute EL50 0.22 mg/l | Crustaceans - *Daphnia magna* | 48 hours | OECD 202 |
| | Acute LL50 79 mg/l Fresh water | Fish - *Oncorhynchus mykiss* | 96 hours | OECD 203 |
| | Chronic NOELR 0.05 mg/l Fresh water | Algae - *Pseudokirchnerella subcapitata* | 72 hours | OECD 201 |

**Conclusion/Summary** : Not available.

### 12.2 Persistence and degradability

**Conclusion/Summary** : Not available.

| Product/substance | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| Fuel oil, residual | - | - | Readily |

### 12.3 Bioaccumulative potential

| Product/substance | $LogK_{ow}$ | BCF | Potential |
|---|---|---|---|
| Fuel oil, residual | 1.99 to 18.02 | 0.4 to 71100 | High |

### 12.4 Mobility in soil

| | | |
|---|---|---|
| **Soil/water partition coefficient ($K_{OC}$)** | : | Not available. |
| **Mobility** | : | Not available. |
| **Mobility in soil** | : | Given its physical and chemical characteristics, the product generally shows low soil mobility Loss by evaporation is limited |

### 12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB in a concentration >= 0,1 %.

### 12.6 Endocrine disrupting properties

This product does not contain any substance present at a concentration equal to or greater than 0.1% by mass, included in the list drawn up in accordance with article 59, paragraph 1 of the REACh Regulation, due to its endocrine disrupting properties, or a substance known to have endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation 2018/605.

### 12.7 Other adverse effects

No known significant effects or critical hazards.

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

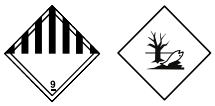
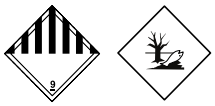
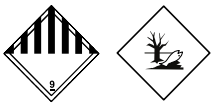
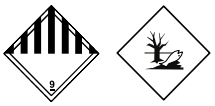
**Product**

| | | |
|---|---|---|
| **Methods of disposal** | : | The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. |
| **Hazardous waste** | : | Yes.<br>According to the European Waste Catalogue, Waste Codes are not product specific, but application specific Waste codes should be assigned by the user based on the application for which the product was used. The following Waste Codes are only suggestions: 13 07 03* 05 07 02 13 04 01 13 04 03 |

**Packaging**

| | | |
|---|---|---|
| **Methods of disposal** | : | The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. |
| **Special precautions** | : | This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. |

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | ICAO/IATA |
|---|---|---|---|---|
| **14.1 UN number or ID number** | UN3082 | UN3082 | UN3082 | UN3082 |
| **14.2 UN proper shipping name** | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual) | Environmentally hazardous substance, liquid, n.o.s. (Fuel oil, residual) |
| **14.3 Transport hazard class(es)** | 9  | 9  | 9  | 9  |
| **14.4 Packing group** | III | III | III | III |
| **14.5 Environmental hazards** | Yes. | Yes. | Yes. | Yes. |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Additional information**

**ADR/RID** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
**Hazard identification number** 90
**Limited quantity** 5 L
**Special provisions** 274, 335, 601, 375
**Tunnel code** (-)

**ADN** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
**Special provisions** 274, 335, 375, 601

**IMDG** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
**Emergency schedules** F-A, S-F
**Special provisions** 274, 335, 969

**ICAO/IATA** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.
**Quantity limitation** Passenger and Cargo Aircraft: 450 L. Packaging instructions: 964. Cargo Aircraft Only: 450 L. Packaging instructions: 964. Limited Quantities - Passenger Aircraft: 30 kg. Packaging instructions: Y964.
**Special provisions** A97, A158, A197, A215

**14.7 Maritime transport in bulk according to IMO instruments** : Not available.

## SECTION 15: Regulatory information

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

**EU Regulation (EC) No. 1907/2006 (REACH)**

**Annex XIV - List of substances subject to authorization**

**Annex XIV**

None of the components are listed.

**Substances of very high concern**

None of the components are listed.

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles**

**Labeling** : Restricted to professional users.

**Other EU regulations**

Take note of Dir 92/85/EC on the protection of pregnant and breastfeeding women at work
Take note of Dir 94/33/EC on the protection of young people at work.
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
DIRECTIVE 2008/68/EC related on the inland transport of dangerous goods
Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens, mutagens or reprotoxics at work
If the working temperature is higher than the flash point :
DIR 2014/34/UE relating to equipment and protective systems intended for use in potentially explosive atmospheres
Directive 1999/92/EC related on the protection of workers in explosive atmospheres

**Industrial emissions (integrated pollution prevention and control) - Air** : Not listed

**Industrial emissions (integrated pollution prevention and control) - Water** : Not listed

**Explosive precursors** : Not applicable.

**Ozone depleting substances (1005/2009/EU)**

Not listed.

**Prior Informed Consent (PIC) (649/2012/EU)**

Not listed.

**Persistent Organic Pollutants**

Not listed.

**Seveso Directive**

This product is controlled under the Seveso Directive.

**Named substances**

| Name |
|---|
| Fuel - Category 34 |

**National regulations**

**Ministry of Social Affairs and Employment (SZW) - Carcinogenic substances and processes, mutagenic or reprotoxic substances**

| Ingredient name | Carcinogen | Mutagen | Reproductive toxicity - Fertility | Reproductive toxicity - Development | Harmful via breastfeeding |
|---|---|---|---|---|---|
| Fuel oil, residual | Listed | Listed | - | - | - |

**Water Discharge Policy (ABM)** : Z(2) Biodegradable substances with hazardous properties for humans and the environment (carcinogenicity/ mutagenicity/ reprotoxicity/ bioacumulative potential or toxicity). Decontamination effort: Z

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

**Montreal Protocol**

Not listed.

**Stockholm Convention on Persistent Organic Pollutants**

Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**

Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**

Not listed.

**LU - Luxembourg prohibited chemicals in the workplace**

Not listed.

**Inventory list**

**Australia inventory (AIIC)** : All components are listed or exempted.

**Canada inventory (DSL/NDSL)** : At least one component is not listed in DSL but all such components are listed in NDSL.

**China inventory (IECSC)** : All components are listed or exempted.

**Europe inventory (EC)** : All components are listed or exempted.

**Japan inventory** : **Japan inventory (CSCL)**: All components are listed or exempted.
**Japan inventory (ISHL)**: Not determined.

**New Zealand Inventory of Chemicals (NZIoC)** : All components are listed or exempted.

**Philippines inventory (PICCS)** : Not determined.

**Korea inventory (KECI)** : Not determined.

**Taiwan Chemical Substances Inventory (TCSI)** : All components are listed or exempted.

**Thailand inventory** : Not determined.

**Turkey inventory** : All components are listed or exempted.

**United States inventory (TSCA 8b)** : All components are listed or exempted.

**Vietnam inventory** : All components are listed or exempted.

**The information stated in this section relates solely to the conformity of the chemical product with the countries Inventories. The information used to confirm the inventory status of this product may be based on additional data to the chemical composition shown in Section 3. Other regulations may apply for importation or marketing authorizations.**

**15.2 Chemical Safety Assessment** : See exposure scenarios

## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ACGIH = American Conference of Governmental Industrial Hygienists
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DNEL = Derived No Effect Level
DMEL = Derived Minimal Effect Level
DMSO = Dimethyl Sulfoxide
EL50 = median Effective Loading
EUH statement = CLP-specific Hazard statement
HSE = Health, Safety and Environment
IC50 = Half maximal inhibitory concentration
IDHL = Immediately dangerous to life or health
LC50 = Median lethal concentration
LD50 = Median lethal dose
LL50 = median Lethal Loading
LogKow = logarithm of the octanol/water partition coefficient
N/A = Not available
NIOSH = National Institute of Occupational Safety and Health
NOAEL = No Observed Adverse Effect Level
NOEC No Observed Effect Concentration
NOEL = No Observed Effect Level
NOELR = No observed Effect Loading Rate
OECD = Organisation for Economic Co-operation and Development
OEL = Occupational Exposure Limit
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
QSAR = Quantitative Structure–Activity Relationship
REL = Recommanded Exposure Limit
STEL = Short Term Exposure Limit
TLV = Threshold Limit Value
TWA = Time Weight Average
VOC = Volatile Organic Compound
vPvB = Very Persistent and Very Bioaccumulative
Unique Formula Identifier (UFI)
UVCB Substance of unknown or Variable composition, Complex reaction products or Biological material

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Acute Tox. 4, H332 | Calculation method |
| Muta. 2, H341 | Calculation method |
| Carc. 1B, H350 | Calculation method |
| Repr. 2, H361d | Calculation method |
| STOT RE 2, H373 (blood, liver, thymus) | Calculation method |
| Aquatic Acute 1, H400 | Calculation method |
| Aquatic Chronic 1, H410 | Calculation method |

**Full text of abbreviated H statements**

| | |
|---|---|
| H332 | Harmful if inhaled. |
| H341 | Suspected of causing genetic defects. |
| H350 | May cause cancer. |
| H361d | Suspected of damaging the unborn child. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H400 | Very toxic to aquatic life. |
| H410 | Very toxic to aquatic life with long lasting effects. |
| EUH066 | Repeated exposure may cause skin dryness or cracking. |

**Full text of classifications [CLP/GHS]**

| | |
|---|---|
| Acute Tox. 4 | ACUTE TOXICITY - Category 4 |
| Aquatic Acute 1 | AQUATIC HAZARD (ACUTE) - Category 1 |
| Aquatic Chronic 1 | AQUATIC HAZARD (LONG-TERM) - Category 1 |
| Carc. 1B | CARCINOGENICITY - Category 1B |
| Muta. 2 | GERM CELL MUTAGENICITY - Category 2 |
| Repr. 2 | TOXIC TO REPRODUCTION - Category 2 |
| STOT RE 2 | SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 |

**Date of revision** : 2024/07/15

**previous revision date** : 2024/07/12

**Version** : 5

**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

## Annex to the extended Safety Data Sheet (eSDS)

**Industrial**

## Identification of the substance or mixture

**Product definition** : Mixture

**Code** : C3DVPSGMC

**Product name** : LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL)

## Section 1 - Title

**Short title of the exposure scenario** : Formulation & (re)packing of substances and mixtures - Industrial

**List of use descriptors** : **Identified use name:** Formulation & (re)packing of substances and mixtures - Industrial
**Process Category:** PROC01, PROC02, PROC03, PROC08a, PROC08b, PROC15, PROC28
**Sector of end use:** SU03, SU10
**Subsequent service life relevant for that use:** No.
**Environmental Release Category:** ERC02

**Environmental contributing scenarios** : **ESVOC SPERC 2.2.v1**

**Health Contributing scenarios** : **Equipment cleaning and maintenance**
**General exposures (closed systems)**
**Laboratory activities**
**marine vessel/barge (un)loading**
**road tanker/rail car loading**
**Product sampling**
**General measures (carcinogens)**
**General measures (aspiration)**
**Storage**
**Bulk transfers**
**Batch process**

**Processes and activities covered by the exposure scenario** : Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.

## Section 2 - Exposure controls

**Contributing scenario controlling environmental exposure for 1: ESVOC SPERC 2.2.v1**

**Product characteristics** : Substance is complex UVCB. Predominantly hydrophobic

**Frequency and duration of use** : Continuous release
Emission days (days/year) : 300

**Environment factors not influenced by risk management** : Local freshwater dilution factor : 10
Local marine water dilution factor : 100

**Other operational conditions of use affecting environmental exposure** : Release fraction to air from process (initial release prior to RMM) : 2.5E-4
Release fraction to wastewater from process (initial release prior to RMM) : 8.0E-6
Release fraction to soil from process (initial release prior to RMM) : 0.0001

**Technical conditions and measures at process level (source) to prevent release** : Common practices vary across sites thus conservative process release estimates used.

| | | |
|---|---|---|
| **Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil** | : | Risk from environmental exposure is driven by humans via indirect exposure<br>Prevent discharge of undissolved substance to or recover from onsite wastewater.<br>If discharging to domestic sewage treatment plant, no onsite wastewater treatment required<br>Treat air emission to provide a typical removal efficiency of (%) : 0<br>Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of(%) : >= 89.4<br>If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%) : >= 0 |
| **Organizational measures to prevent/limit release from site** | : | Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** | : | Estimated substance removal from wastewater via domestic sewage treatment (%): 90.6<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 90.6<br>Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal(kg/d) : 1.1E+5<br>Assumed domestic sewage treatment plant flow (m3/d) : 2000 |
| **Conditions and measures related to external treatment of waste for disposal** | : | External treatment and disposal of waste should comply with applicable local and/or national regulations. |
| **Conditions and measures related to external recovery of waste** | : | External recovery and recycling of waste should comply with applicable local and/or national regulations. |

**Contributing scenario controlling worker exposure for 2: Equipment cleaning and maintenance**

| | | |
|---|---|---|
| **Technical conditions and measures at process level (source) to prevent release** | : | Retain drain-downs in sealed storage pending disposal or for subsequent recycle. |
| **Process control/change measures** | : | Drain down system prior to equipment break-in or maintenance. |

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

| | | |
|---|---|---|
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. |

**Contributing scenario controlling worker exposure for 3: General exposures (closed systems)**

| | | |
|---|---|---|
| **Frequency and duration of use/exposure** | : | Avoid carrying out activities involving exposure for more than 4 hours. |
| **Process control/change measures** | : | Handle substance within a closed system. |
| **Engineering controls** | : | Sample via a closed loop or other system to avoid exposure. |

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

| | | |
|---|---|---|
| **Advice on general occupational hygiene** | : | Provide extract ventilation to points where emissions occur. Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes process temperature up to 90°C Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Provide employee with skin care programmes. |
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. |

**Contributing scenario controlling worker exposure for 4: Laboratory activities**

| | | |
|---|---|---|
| **Process control/change measures** | : | Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374. |

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

| | | |
|---|---|---|
| **Advice on general occupational hygiene** | : | Assumes process temperature up to 90.0°C. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Provide employee with skin care programmes. |

**Contributing scenario controlling worker exposure for 5: marine vessel/barge (un)loading**

**Frequency and duration of use/exposure** : Avoid carrying out activities involving exposure for more than 4 hours.

**Technical conditions and measures at process level (source) to prevent release** : Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

**Engineering controls** : Transfer via enclosed lines. Clear transfer lines prior to de-coupling.

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

**Advice on general occupational hygiene** : Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Wear a respirator conforming to EN140. Ensure operation is undertaken outdoors. Assumes process temperature up to 60.0°C. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Wear suitable coveralls to prevent exposure to the skin. Provide employee with skin care programmes. Ensure no splashing occurs during transfer.

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 6: road tanker/rail car loading**

**Ventilation control measures** : Ensure material transfers are under containment or extract ventilation.

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

**Advice on general occupational hygiene** : Covers use up to 2.0 h/day. Ensure displaced vapours are vented to a safe location. Transfer via enclosed lines. Wear a respirator conforming to EN140. Ensure operation is undertaken outdoors. Assumes process temperature up to 80.0°C. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Wear suitable coveralls to prevent exposure to the skin. Provide employee with skin care programmes. Ensure no splashing occurs during transfer.

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 7: Product sampling**

**Frequency and duration of use/exposure** : Avoid carrying out operation for more than 15 minutes.

**Engineering controls** : Sample via a closed loop or other system to avoid exposure.

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

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 8: General measures (carcinogens)**

**Technical conditions and measures at process level (source) to prevent release** : Consider technical advances and process upgrades (including automation) for the elimination of releases.
Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation.
Drain down systems and clear transfer lines prior to breaking containment.
Clean/flush equipment, where possible, prior to maintenance.
Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.
Ensure safe systems of work or equivalent arrangements are in place to manage risks.
Regularly inspect, test and maintain all control measures.
Consider the need for risk-based health surveillance.

**Contributing scenario controlling worker exposure for 9: General measures (aspiration)**

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

**Advice on general occupational hygiene** : Do not ingest. If swallowed then seek immediate medical assistance. Applicable if classified as H304, refer to section 2 of the SDS.

**Contributing scenario controlling worker exposure for 10: Storage**

**Process control/change measures** : No other specific measures identified.

**Ventilation control measures** : Provide extract ventilation to points where emissions occur.

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

**Advice on general occupational hygiene** : Store substance within a closed system. Assumes process temperature up to 90.0 °C. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Provide employee with skin care programmes.

**Contributing scenario controlling worker exposure for 11: Bulk transfers**

**Process control/change measures** : No other specific measures identified.

**Contributing scenario controlling worker exposure for 12: Batch process**

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

**Advice on general occupational hygiene** : Covers use up to 4.0 h/day Provide extract ventilation to points where emissions occur. Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes process temperature up to 90.0°C Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Provide employee with skin care programmes.

## Section 3 - Exposure estimation and reference to its source

**Website:** : Not applicable.

**Exposure estimation and reference to its source - Environment: 1: ESVOC SPERC 2.2.v1**

**Exposure assessment (environment):** : The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 2: Equipment cleaning and maintenance**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 3: General exposures (closed systems)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 4: Laboratory activities**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 5: marine vessel/barge (un)loading**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 6: road tanker/rail car loading**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 7: Product sampling**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 8: General measures (carcinogens)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 9: General measures (aspiration)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 10: Storage**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 11: Bulk transfers**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 12: Batch process**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

## Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

**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/en/reach-for-industries-libraries.html).

**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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk management measures are based on qualitative risk characterisation.

## Additional good practice advice beyond the REACH CSA

**Environment** : Not available.

**Health** : Not available.

## Annex to the extended Safety Data Sheet (eSDS)

**Industrial**

## Identification of the substance or mixture

**Product definition** : Mixture

**Code** : C3DVPSGMC

**Product name** : LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL)

## Section 1 - Title

**Short title of the exposure scenario** : Use as a fuel - Industrial

**List of use descriptors** : **Identified use name:** Use as a fuel - Industrial
**Process Category:** PROC01, PROC02, PROC08a, PROC08b, PROC16, PROC28
**Sector of end use:** SU03
**Subsequent service life relevant for that use:** No.
**Environmental Release Category:** ERC07

**Environmental contributing scenarios** : **ESVOC SPERC 7.12a.v1**

**Health Contributing scenarios** : **Equipment cleaning and maintenance -** PROC08a, PROC28
**General exposures (closed systems) -** PROC01, PROC02
**General measures (carcinogens)**
**Drum/batch transfers -** PROC08b
**Operation of solids filtering equipment -** PROC02
**Closed systems -** PROC16
**Bulk transfers -** PROC08b
**General measures (aspiration)**
**Storage -** PROC01, PROC02

**Processes and activities covered by the exposure scenario** : Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.

## Section 2 - Exposure controls

**Contributing scenario controlling environmental exposure for 1: ESVOC SPERC 7.12a.v1**

**Product characteristics** : Substance is complex UVCB. Predominantly hydrophobic

**Frequency and duration of use** : Continuous release
Emission days (days/year) : 300

**Environment factors not influenced by risk management** : Local freshwater dilution factor : 10
Local marine water dilution factor : 100

**Other operational conditions of use affecting environmental exposure** : Release fraction to air from process (initial release prior to RMM) : 5.0E-3
Release fraction to wastewater from process (initial release prior to RMM) : 1.5E-7
Release fraction to soil from process (initial release prior to RMM): 0

**Technical conditions and measures at process level (source) to prevent release** : Common practices vary across sites thus conservative process release estimates used.

**Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil** : Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Treat air emission to provide a typical removal efficiency of (%) : 95
Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of(%): >= 89.6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)(%): >= 0

| | | |
|---|---|---|
| **Organizational measures to prevent/limit release from site** | : | Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** | : | Not applicable as there is no release to wastewater.<br>Estimated substance removal from wastewater via domestic sewage treatment (%): 90.6<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 90.6<br>Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal(kg/d) : 5.6E+6<br>Assumed domestic sewage treatment plant flow (m3/d) : 2000 |
| **Conditions and measures related to external treatment of waste for disposal** | : | Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations. |
| **Conditions and measures related to external recovery of waste** | : | This substance is consumed during use and no waste from the substance is generated.<br>Maximum Risk Characterization Ratios for air emissions : 9.7E-2<br>Maximum Risk Characterization Ratios for waste water emissions : 9.0E-1 |

**Contributing scenario controlling worker exposure for 2: Equipment cleaning and maintenance**

| | | |
|---|---|---|
| **Frequency and duration of use/exposure** | : | Covers exposure up to 4.0 h/day. |
| **Technical conditions and measures at process level (source) to prevent release** | : | Retain drain-downs in sealed storage pending disposal or for subsequent recycle. |
| **Process control/change measures** | : | Drain down system prior to equipment break-in or maintenance. |

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

| | | |
|---|---|---|
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Wear suitable coveralls to prevent exposure to the skin. |
| **Respiratory protection** | : | Wear a respirator conforming to EN140. |

**Contributing scenario controlling worker exposure for 3: General exposures (closed systems)**

| | | |
|---|---|---|
| **Frequency and duration of use/exposure** | : | Avoid carrying out activities involving exposure for more than 4 hours. |
| **Process control/change measures** | : | Handle substance within a closed system. |
| **Engineering controls** | : | Sample via a closed loop or other system to avoid exposure. |

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

| | | |
|---|---|---|
| **Advice on general occupational hygiene** | : | Assumes process temperature up to 90.0°C.<br>Provide employee with skin care programmes. |
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. |

**Contributing scenario controlling worker exposure for 4: General measures (carcinogens)**

| | | |
|---|---|---|
| **Technical conditions and measures at process level (source) to prevent release** | : | Consider technical advances and process upgrades (including automation) for the elimination of releases.<br>Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation.<br>Drain down systems and clear transfer lines prior to breaking containment.<br>Clean/flush equipment, where possible, prior to maintenance.<br>Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.<br>Ensure safe systems of work or equivalent arrangements are in place to manage risks.<br>Regularly inspect, test and maintain all control measures. |

Consider the need for risk-based health surveillance.

**Contributing scenario controlling worker exposure for 5: Drum/batch transfers**

**Ventilation control measures** : Ensure material transfers are under containment or extract ventilation. Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour). or . Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than1 hour.

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

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 6: Operation of solids filtering equipment**

**Ventilation control measures** : Provide a good standard of controlled ventilation (not less than 3 to 5 air changes per hour) Avoid carrying out activities involving exposure for more than 4 hours.

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

**Advice on general occupational hygiene** : Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply Assumes process temperature up to 90.0°C.

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 7: Bulk transfers**

**Process control/change measures** : No other specific measures identified.

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

**Advice on general occupational hygiene** : Covers use up to 4.0 h/day.
Ensure material transfers are under containment or extract ventilation.
Wear a respirator conforming to EN140.
Ensure operation is undertaken outdoors.
Assumes process temperature up to 90.0°C.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Provide employee with skin care programmes.

**Contributing scenario controlling worker exposure for 8: General measures (aspiration)**

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

**Advice on general occupational hygiene** : Applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance.

**Contributing scenario controlling worker exposure for 9: Storage**

**Frequency and duration of use/exposure** : Assumes process temperature up to 90.0°C.
Covers use up to 1.0h/day.

**Process control/change measures** : No other specific measures identified.

**Ventilation control measures** : 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**

**Advice on general occupational hygiene** : Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

**Personal protection** : Provide employee with skin care programmes.

## Section 3 - Exposure estimation and reference to its source

**Website:** : Not applicable.

**Exposure estimation and reference to its source - Environment: 1: ESVOC SPERC 7.12a.v1**

**Exposure assessment (environment):** : The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 2: Equipment cleaning and maintenance**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 3: General exposures (closed systems)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 4: General measures (carcinogens)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 5: Drum/batch transfers**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 6: Operation of solids filtering equipment**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 7: Closed systems**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 8: Bulk transfers**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 9: General measures (aspiration)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 10: Storage**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

## Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

| | | |
|---|---|---|
| **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/en/reach-for-industries-libraries.html). |
| **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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk management measures are based on qualitative risk characterisation. |

## Additional good practice advice beyond the REACH CSA

| | | |
|---|---|---|
| **Environment** | : | Not available. |
| **Health** | : | Not available. |

## Annex to the extended Safety Data Sheet (eSDS)

**Professional**

## Identification of the substance or mixture

**Product definition** : Mixture

**Code** : C3DVPSGMC

**Product name** : LOW SULPHUR FUEL OIL WITH FAME CONTENT (BIOFUEL)

## Section 1 - Title

**Short title of the exposure scenario** : Use as a fuel - Professional

**List of use descriptors** : **Identified use name:** Use as a fuel - Professional
**Process Category:** PROC01, PROC02, PROC08a, PROC08b, PROC16, PROC28
**Sector of end use:** SU22
**Subsequent service life relevant for that use:** No.
**Environmental Release Category:** ERC09a, ERC09b

**Environmental contributing scenarios** : **ESVOC SPERC 9.12b.v1**

**Health Contributing scenarios** : **Equipment cleaning and maintenance -** PROC08a, PROC28
**General exposures (closed systems) -** PROC01, PROC02
**General measures (carcinogens)**
**Drum/batch transfers -** PROC08b
**Refuelling -** PROC08b
**General measures (aspiration)**
**Closed systems -** PROC16
**Storage -** PROC01, PROC02
**Bulk transfers -** PROC08b

**Processes and activities covered by the exposure scenario** : Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.

## Section 2 - Exposure controls

**Contributing scenario controlling environmental exposure for 1: ESVOC SPERC 9.12b.v1**

**Product characteristics** : Substance is complex UVCB. Predominantly hydrophobic

**Frequency and duration of use** : Continuous release
Emission days (days/year) : 365

**Environment factors not influenced by risk management** : Local freshwater dilution factor : 10
Local marine water dilution factor : 100

**Other operational conditions of use affecting environmental exposure** : Release fraction to air from wide dispersive use (regional only) : 5.0E-3
Release fraction to wastewater from wide dispersive use : 1.0E-6
Release fraction to soil from wide dispersive use (regional only): 0.00025

**Technical conditions and measures at process level (source) to prevent release** : Common practices vary across sites thus conservative process release estimates used.

**Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil** : Risk from environmental exposure is driven by humans via indirect exposure
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required
Treat air emission to provide a typical removal efficiency of (%) : N/A
Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of(%) : >= 88.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%) : >= 0

| | | |
|---|---|---|
| **Organizational measures to prevent/limit release from site** | : | Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** | : | Not applicable as there is no release to wastewater.<br>Estimated substance removal from wastewater via domestic sewage treatment (%): 90.6<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 90.6<br>Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal(kg/d) : 2.7E+3<br>Assumed domestic sewage treatment plant flow (m3/d) : 2000 |
| **Conditions and measures related to external treatment of waste for disposal** | : | Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations. |
| **Conditions and measures related to external recovery of waste** | : | This substance is consumed during use and no waste from the substance is generated.<br>Maximum Risk Characterization Ratios for air emissions : 7.58E-3<br>Maximum Risk Characterization Ratios for waste water emissions : 7.9E-1 |

**Contributing scenario controlling worker exposure for 2: Equipment cleaning and maintenance**

| | | |
|---|---|---|
| **Technical conditions and measures at process level (source) to prevent release** | : | Retain drain-downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. |
| **Process control/change measures** | : | Drain down system prior to equipment break-in or maintenance. |
| **Ventilation control measures** | : | 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**

| | | |
|---|---|---|
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. |

**Contributing scenario controlling worker exposure for 3: General exposures (closed systems)**

| | | |
|---|---|---|
| **Process control/change measures** | : | Handle substance within a closed system. |
| **Engineering controls** | : | Sample via a closed loop or other system to avoid exposure. |
| **Ventilation control measures** | : | Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Avoid carrying out activities involving exposure for more than 1 hour. |

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

| | | |
|---|---|---|
| **Personal protection** | : | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. |

**Contributing scenario controlling worker exposure for 4: General measures (carcinogens)**

| | | |
|---|---|---|
| **Technical conditions and measures at process level (source) to prevent release** | : | Consider technical advances and process upgrades (including automation) for the elimination of releases.<br>Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation.<br>Drain down systems and clear transfer lines prior to breaking containment.<br>Clean/flush equipment, where possible, prior to maintenance.<br>Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.<br>Ensure safe systems of work or equivalent arrangements are in place to manage risks.<br>Regularly inspect, test and maintain all control measures.<br>Consider the need for risk-based health surveillance. |

**Contributing scenario controlling worker exposure for 5: Drum/batch transfers**

**Ventilation control measures** : Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Ensure material transfers are under containment or extract ventilation. Avoid carrying out activities involving exposure for more than1 hour.

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

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 6: Refuelling**

**Ventilation control measures** : Ensure material transfers are under containment or extract ventilation. Avoid carrying out activities involving exposure for more than 1 hour.

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

**Personal protection** : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

**Contributing scenario controlling worker exposure for 7: Storage**

**Process control/change measures** : No other specific measures identified.

**Contributing scenario controlling worker exposure for 8: Bulk transfers**

**Process control/change measures** : No other specific measures identified.

## Section 3 - Exposure estimation and reference to its source

**Website:** : Not applicable.

**Exposure estimation and reference to its source - Environment: 1: ESVOC SPERC 9.12b.v1**

**Exposure assessment (environment):** : The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 2: Equipment cleaning and maintenance**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 3: General exposures (closed systems)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 4: General measures (carcinogens)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 5: Drum/batch transfers**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 6: Refuelling**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 7: General measures (aspiration)**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 8: Closed systems**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 9: Storage**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

**Exposure estimation and reference to its source - Workers: 10: Bulk transfers**

**Exposure assessment (human):** : The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Exposure estimation and reference to its source** : Not available.

## Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

**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/en/reach-for-industries-libraries.html).

**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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk management measures are based on qualitative risk characterisation.

## Additional good practice advice beyond the REACH CSA

**Environment** : Not applicable. Not available.

**Health** : Not available.