# SAFETY DATA SHEET

## SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

As of the revision date above, this SDS meets the regulations in Ireland and Northern Ireland.

### 1.1. PRODUCT IDENTIFIER

**Product Name:** **LFO LIGHT FUELL**
**Product Description:** Petroleum Hydrocarbons
**Product Code:** 708742-60

**Registration Name:**
Fuel oil, residual

**Identification Number:** (CAS #)68476-33-5

**Registration Number:**
01-2119474894-22

| Trade Names | Trade Names |
|---|---|
| LFO LIGHT FUELL | MFO MEDIUM FUEL |

### 1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

**Intended Use:** Fuel oil, Refinery process stream

**Identified Uses:**
Manufacture of substance
Distribution of substance
Use as an intermediate
Formulation and (re)packing of substances and mixtures
Use as a fuel - Industrial
Use as a fuel - Professional
Road and construction applications

See Section 16 for list of REACH Use Descriptors for Identified Uses shown above.

**Uses advised against:** This product is not recommended for any industrial, professional or consumer use other than the Identified Uses above.

### 1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

**Supplier:** **Esso Ireland Ltd**
5 Harbourmaster Place
Level 2
IFSC Dublin 1
Ireland

**Supplier General Contact:** sds.uk@exxonmobil.com

| | |
|---|---|
| **SDS Internet Address:** | www.msds.exxonmobil.com |
| **E-Mail:** | (+353) 1 670 2990 |

### 1.4. EMERGENCY TELEPHONE NUMBER

| | |
|---|---|
| **24 Hour Emergency Telephone:** | (IE) +353-1-901-4670 (CHEMTREC) / (UK) +44-870-820-04-18 (CHEMTREC) |

## SECTION 2 HAZARDS IDENTIFICATION

### 2.1. CLASSIFICATION OF SUBSTANCE OR MIXTURE

**Classification according to Regulation (EC) No 1272/2008**
Acute inhalation toxicant: Category 4., H332: Harmful if inhaled.
Carcinogen: Category 1B., H350: May cause cancer.
Reproductive toxicant (developmental): Category 2., H361d: Suspected of damaging the unborn child.
Specific target organ toxicant (repeated exposure): Category 2., H373: May cause damage to organs through prolonged or repeated exposure.
Acute aquatic toxicant: Category 1., H400: Very toxic to aquatic life.
Chronic aquatic toxicant: Category 1., H410: Very toxic to aquatic life with long lasting effects.

### 2.2. LABEL ELEMENTS

**Label elements according to Regulation (EC) No 1272/2008**

**Pictograms:**

**Signal Word:** Danger

**Hazard Statements:**

Health:
H332: Harmful if inhaled.
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).
Environment:
H410: Very toxic to aquatic life with long lasting effects.

**Precautionary Statements:**

Prevention:
P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe mist / vapours.
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves and clothing.

Response:

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313: IF exposed or concerned: Get medical advice/ attention.
P312: Call a POISON CENTRE or doctor/physician if you feel unwell.
P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents and container in accordance with local regulations.

**Contains:** Fuel oil, residual

### 2.3. OTHER HAZARDS

**Physical / Chemical Hazards:**

Thermal burn hazard - contact with hot material may cause thermal burns. Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Combustible.

**Health Hazards:**

High-pressure injection under skin may cause serious damage. Hydrogen sulphide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. May be irritating to the eyes, nose, throat, and lungs.

**Environmental Hazards:**

No additional hazards.Material does not meet the criteria for PBT or vPvB in accordance with REACH Annex XIII.

**Endocrine Disrupting Properties:**

No known endocrine disrupting properties.

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1. SUBSTANCES

This material is defined as a substance.

**Reportable hazardous substance(s) complying with the classification criteria and/or with an exposure limit (OEL)**

| Name | CAS# | EC# | Registration# | Concentration * | GHS/CLP classification | Specific Conc. Limits, M- |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | **factors and ATEs** |
| Fuel oil, residual | 68476-33-5 | 270-675-6 | 01-2119474894-22 | 100 % | Acute Tox. 4 H332, Carc. 1B H350, EUH066, Repr. 2 H361d, Aquatic Acute 1 H400 (M factor 1), Aquatic Chronic 1 H410 (M factor 1), STOT RE 2 H373 | - |

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

**Reportable hazardous constituent(s) contained in UVCB- and/or multi-constituent substance(s) complying with the classification criteria and/or with an exposure limit (OEL)**

| Name | CAS# | EC# | Concentration* | GHS/CLP Classification | Specific Conc. Limits, M-factors and ATEs |
|---|---|---|---|---|---|
| hydrogen sulphide | 7783-06-4 | 231-977-3 | < 0.1% | Acute Tox. 2 H330, Flam. Gas 1 H220, Press. Gas H280, Aquatic Acute 1 H400 (M factor 1) | - |

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

NOTE: Carbon monoxide (CO) may be present in the material in trace quantities and, when present, may accumulate to toxic or flammable concentrations in enclosed spaces such as tanks or tanker/railcar headspaces.

Note: See SDS Section 16 for full text of hazard statements.

**3.2. MIXTURES** Not Applicable. This product is regulated as a substance.

## SECTION 4 FIRST AID MEASURES

### 4.1. DESCRIPTION OF FIRST AID MEASURES

**INHALATION**

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

**SKIN CONTACT**

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any

part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

**EYE CONTACT**

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

**INGESTION**

Seek immediate medical attention.

**4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED**

Headache, dizziness, drowsiness, nausea and other CNS effects. Respiratory and eye irritation, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Fatigue, difficulty sleeping, irritability and gastrointestinal problems. Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after injection.

**4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED**

The need to have special means for providing specific and immediate medical treatment available in the workplace is not expected.

## SECTION 5 FIRE FIGHTING MEASURES

**5.1. EXTINGUISHING MEDIA**

**Suitable Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

**Unsuitable Extinguishing Media:** Straight streams of water

**5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE**

**Hazardous Combustion Products:** Aldehydes, Hydrogen sulphide, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

**5.3. ADVICE FOR FIRE FIGHTERS**

**Fire Fighting Instructions:** Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Unusual Fire Hazards:** Combustible. Hazardous material. Firefighters should consider protective equipment indicated in Section 8. The product may form flammable mixtures and can burn only when heated above the flash point.

**FLAMMABILITY PROPERTIES**

**Flash Point [Method]:** >60°C (140°F) [ASTM D-93]
**Upper/Lower Flammable Limits (Approximate volume % in air):** UEL: 6.0 LEL: 1.0 [test method unavailable]
**Autoignition Temperature:** >250°C (482°F) [ASTM E659]

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### 6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

**NOTIFICATION PROCEDURES**

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

**PROTECTIVE MEASURES**

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

### 6.2. ENVIRONMENTAL PRECAUTIONS

Remove debris in path of spill prior to oiling and remove contaminated debris from shoreline and water surface. Dispose of according to local regulations. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

### 6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

**Land Spill:** Stop leak if you can do so without risk. Do not touch or walk through spilled material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

**Water Spill:** Stop leak if you can do so without risk. Material will sink. Remove material, as much as possible, using mechanical equipment.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### 6.4. REFERENCES TO OTHER SECTIONS

See Sections 8 and 13.

## SECTION 7 HANDLING AND STORAGE

### 7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid all personal contact. Residual fuel oils may require heating and other forms of pre-treatment before use

and will normally be stored and handled in facilities fitted with heating systems. Users should ensure their facilities are capable of storing and handling these fuels at or just above an appropriate temperature. Proper temperatures for storage and handling will depend on a number of factors such as the viscosity of the fuel and the specific requirements of the heating plant or engine that will consume the fuel. Users should consult the fuel supplier on appropriate storage and handling temperatures. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Harmful amounts of H2S may be present. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation.

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator 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, anti-static additives and filtration can greatly influence the conductivity of a liquid.

### 7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

### 7.3. SPECIFIC END USES

Section 1 informs about identified end-uses. No industrial or sector specific guidance available.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1. CONTROL PARAMETERS

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

| Substance Name | Form | Limit/Standard | | | Note | Source |
|---|---|---|---|---|---|---|
| Fuel oil, residual [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil |
| hydrogen sulphide | | STEL | 14 mg/m3 | 10 ppm | | UK EH40 |
| hydrogen sulphide | | STEL | 14 mg/m3 | 10 ppm | | Ireland OELs |
| hydrogen sulphide | | TWA | 7 mg/m3 | 5 ppm | | Ireland OELs |
| hydrogen sulphide | | TWA | 7 mg/m3 | 5 ppm | | UK EH40 |
| hydrogen sulphide | | STEL | 14 mg/m3 | 10 ppm | | ExxonMobil |

| | | | | | | |
|---|---|---|---|---|---|---|
| hydrogen sulphide | | TWA | 7 mg/m3 | 5 ppm | | ExxonMobil |
| Carbon monoxide | | STEL | 117 mg/m3 | 100 ppm | | UK EH40 |
| Carbon monoxide | | STEL | 117 mg/m3 | 100 ppm | | Ireland OELs |
| Carbon monoxide | | TWA | 23 mg/m3 | 20 ppm | | UK EH40 |
| Carbon monoxide | | TWA | 23 mg/m3 | 20 ppm | | Ireland OELs |
| Carbon monoxide | | TWA | 25 ppm | | | ACGIH |

IE - Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations (2001-2015) and Safety, Health and Welfare at Work (Carcinogens) Regulations (2001-2019)
UK - EH40 Workplace Exposure Limits. Exposure limits for use with Control of Substances Hazardous to Health Regulations 2002 (as amended)

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

| | |
|---|---|
| IE | Health and Safety Executive (HSE) |
| UK | Health and Safety Executive (HSE) |

## DERIVED NO EFFECT LEVEL (DNEL)/DERIVED MINIMAL EFFECT LEVEL (DMEL)

### Worker

| Substance Name | Dermal | Inhalation |
|---|---|---|
| Fuel oil, residual | 0.065 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects | 0.12 mg/m3 DNEL, Chronic Exposure, Systemic Effects |

### Consumer

| Substance Name | Dermal | Inhalation | Oral |
|---|---|---|---|
| Fuel oil, residual | NA | NA | 0.015 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects |

Note: The Derived No Effect Level (DNEL) is an estimated safe level of exposure that is derived from toxicity data in accord with specific guidance within the REACH regulation. The DNEL may differ from an Occupational Exposure Limit (OEL) for the same chemical. OELs may be recommended by an individual company, a governmental regulatory body or an expert organization, such as the Scientific Committee for Occupational Exposure Limits (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered to be safe exposure levels for a typical worker in an occupational setting for an 8-hour work shift, 40 hour work week, as a time weighted average (TWA) or a 15 minute short-term exposure limit (STEL). While also considered to be protective of health, OELs are derived by a process different from that of REACH.

## PREDICTED NO EFFECT CONCENTRATION (PNEC)

| Substance Name | Aqua (fresh water) | Aqua (marine water) | Aqua (intermittent release) | Sewage treatment plant | Sediment | Soil | Oral (secondary poisoning) |
|---|---|---|---|---|---|---|---|
| Fuel oil, residual | NA | NA | NA | NA | NA | NA | 66.7 mg / kg (food) |

## 8.2. EXPOSURE CONTROLS

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H2S vapours may accumulate is recommended. European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If product is hot, thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves. Nitrile, minimum 0.38 mm thickness or comparable protective barrier material with a high performance level for continuous contact use conditions, permeation breakthrough minimum 480 minutes in accordance with CEN standards EN 420 and EN 374.

**Eye Protection:** If contact with material is likely, chemical goggles are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended. If product is hot, thermally protective, chemical resistant apron and long sleeves are recommended.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing 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.

**For Summary of Risk Management Measures across all identified uses, see Annex.**

**ENVIRONMENTAL CONTROLS**

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.**

### 9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

**Physical State:** Liquid
**Form:** Viscous
**Colour:** Dark Brown
**Odour:** Petroleum/Solvent
**Odour Threshold:** No data available
**Melting Point / Freezing Point:** No data available / No data available
**Initial Boiling Point / and Boiling Range:** > 200°C (392°F) [ASTM D86]
**Flammability (Solid, Gas):** Not technically feasible
**Lower and Upper explosion limit:** UEL: 6.0 LEL: 1.0 [test method unavailable]
**Flash Point [Method]:** >60°C (140°F) [ASTM D-93]
**Autoignition Temperature:** >250°C (482°F) [ASTM E659]
**Decomposition Temperature:** No data available
**pH:** Not technically feasible
**Kinematic Viscosity:** [N/D at 40ºC] | > 20.5 cSt (20.5 mm2/sec) at 50°C - 850 cSt (850 mm2/sec) at 50°C [test method unavailable]
**Solubility:** Negligible
**Partition coefficient (n-Octanol/Water Partition Coefficient):** No data available
**Vapour Pressure:** < 0.133 kPa (1 mm Hg) at 20 °C | 0.02 kPa (0.15 mm Hg) at 120 °C - 0.791 kPa (5.93 mm Hg) at 120°C [test method unavailable]
**Relative Density (at 15 °C):** < 1.02 [test method unavailable]
**Relative Vapour Density (Air = 1):** No data available
**Evaporation Rate (n-butyl acetate = 1):** No data available
**Explosive Properties:** None
**Oxidizing Properties:** None
**Particle Characteristics**
**Median particle size:** Not Applicable

### 9.2. OTHER INFORMATION

**Density (at 15 ºC):** 840 kg/m3 (7.01 lbs/gal, 0.84 kg/dm3) - 1200 kg/m3 (10.01 lbs/gal, 1.2 kg/dm3) [ISO 12185]

#### 9.2.1. INFORMATION WITH REGARD TO PHYSICAL HAZARD CLASSES

No data available

#### 9.2.2. OTHER SAFETY CHARACTERISTICS

No data available

## SECTION 10 STABILITY AND REACTIVITY

**10.1. REACTIVITY:** See sub-sections below.

**10.2. CHEMICAL STABILITY:** Material is stable under normal conditions.

**10.3. POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

**10.4. CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**10.5. INCOMPATIBLE MATERIALS:** Alkalies, Halogens, Strong Acids, Strong oxidisers

**10.6. HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

## SECTION 11 TOXICOLOGICAL INFORMATION

### 11.1. INFORMATION ON HAZARD CLASSES AS DEFINED IN REGULATION (EC) NO 1272/2008

| Hazard Class | Conclusion / Remarks |
|---|---|
| **Inhalation** | |
| Acute Toxicity: (Rat) 4 hour(s) LC50 4100 mg/m3 (Aerosol) | Moderately toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403 |
| Irritation: No end point data for material. | Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. |
| **Ingestion** | |
| Acute Toxicity (Rat): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification. | Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401 |
| **Skin** | |
| Acute Toxicity (Rabbit): LD50 > 2000 mg/kg Test scores or other study results do not meet criteria for classification. | Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402 |
| Skin Corrosion/Irritation (Rabbit): Data available. Test scores or other study results do not meet criteria for classification. | May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404 |
| **Eye** | |
| Serious Eye Damage/Irritation (Rabbit): Data available. Test scores or other study results do not meet criteria for classification. | May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405 |
| **Sensitisation** | |
| Respiratory Sensitization: No end point data for material. | Not expected to be a respiratory sensitizer. |
| Skin Sensitization: Data available. Test scores or other study results do not meet criteria for classification. | Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406 |
| **Aspiration:** Data available. | Not expected to be an aspiration hazard. Based on physico-chemical properties of the material. |
| **Germ Cell Mutagenicity:** Data available. | Not expected to be a germ cell mutagen. Based on test data for |

| | |
|---|---|
| Test scores or other study results do not meet criteria for classification. | structurally similar materials. Test(s) equivalent or similar to OECD Guideline 474 475 476 |
| **Carcinogenicity:** Data available. | Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451 |
| **Reproductive Toxicity:** Data available. | Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 416 |
| **Lactation:** No end point data for material. | Not expected to cause harm to breast-fed children. |
| **Specific Target Organ Toxicity (STOT)** | |
| Single Exposure: No end point data for material. | Not expected to cause organ damage from a single exposure. |
| Repeated Exposure: Data available. | Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 411 |

**TOXICITY FOR SUBSTANCES**

| NAME | ACUTE TOXICITY |
|---|---|
| hydrogen sulphide | Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat) |

### 11.2. INFORMATION ON OTHER HAZARDS

#### 11.2.1 ENDOCRINE DISRUPTING PROPERTIES

No known endocrine disrupting properties that affect human health.

#### 11.2.2 OTHER INFORMATION

**For the product itself:**

Target Organs Repeated Exposure: Blood, Liver, Thymus

Residual fuel oil: Carcinogenic in animal tests. Caused mutations in-vitro. Dermal exposure to high concentrations resulted in maternal toxicity, decreased fetal weight and fetal survival, and some external fetal malformations. Dermal studies in animals: increased mortality, skin irritation, liver, kidney, thymus, bone marrow, blood and lymphoid tissue toxic effects. Possible allergen and photoallergen.

**Contains:**

HYDROGEN SULPHIDE: Chronic health effects due to repeated exposures to low levels of H2S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H2S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage.

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

### 12.1. TOXICITY

Material -- Expected to be very toxic to aquatic organisms. May cause long-term adverse effects in the

aquatic environment.

**12.2. PERSISTENCE AND DEGRADABILITY**
**Biodegradation:**
Material -- Expected to be inherently biodegradable

**12.3. BIOACCUMULATIVE POTENTIAL**
Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

**12.4. MOBILITY IN SOIL**
Majority of components -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.
Majority of components -- Low potential to migrate through soil.

**12.5. PERSISTENCE, BIOACCUMULATION AND TOXICITY FOR SUBSTANCE(S)**
Material does not meet the Reach Annex XIII criteria for PBT or vPvB.

**12.6. ENDOCRINE DISRUPTING PROPERTIES**
No known endocrine disrupting properties that affect the environment.

**12.7. OTHER ADVERSE EFFECTS**
No adverse effects are expected.

**ECOLOGICAL DATA**

**Ecotoxicity**

| Test | Duration | Organism Type | Test Results |
|---|---|---|---|
| Aquatic - Acute Toxicity | 48 hour(s) | Daphnia magna | EL50 1 - >1000 mg/l: data for similar materials |
| Aquatic - Acute Toxicity | 96 hour(s) | Oncorhynchus mykiss | LL50 10 - >1000 mg/l: data for similar materials |
| Aquatic - Acute Toxicity | 72 hour(s) | Pseudokirchneriella subcapitata | EL50 0.1 - 100 mg/l: data for similar materials |
| Aquatic - Chronic Toxicity | 72 hour(s) | Pseudokirchneriella subcapitata | NOELR <1 mg/l: data for similar materials |

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**13.1. WASTE TREATMENT METHODS**
Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

**European Waste Code:** 13 07 01*

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to The Hazardous Waste Regulations (HWR), and subject to the provisions of those Regulations.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

**LAND (ADR/RID)**

**14.1. UN (or ID) Number:** 3082
**14.2. UN Proper Shipping Name (Technical Name):** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil)
**14.3. Transport Hazard Class(es):** 9
**14.4. Packing Group:** III
**14.5. Environmental Hazards:** Yes
**14.6. Special Precautions for users:**
**Classification Code:** M6
**Label(s) / Mark(s):** 9, EHS
**Hazard ID Number:** 90
**Hazchem EAC:** 3Z

**INLAND WATERWAYS (ADN)**

**14.1. UN (or ID) Number:** 3082
**14.2. UN Proper Shipping Name (Technical Name):** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil)
**14.3. Transport Hazard Class(es):** 9
**14.4. Packing Group:** III
**14.5. Environmental Hazards:** Yes
**14.6. Special Precautions for users:**
**Hazard ID Number:** 90
**Label(s) / Mark(s):** 9 (CMR, N1, S), EHS

**SEA (IMDG)**

**14.1. UN (or ID) Number:** 3082
**14.2. UN Proper Shipping Name (Technical Name):** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil)
**14.3. Transport Hazard Class(es):** 9
**14.4. Packing Group:** III

**14.5. Environmental Hazards:** Marine Pollutant
**14.6. Special Precautions for users:**
**Label(s):** 9
**EMS Number:** F-A, S-F
**Transport Document Name:** UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil), 9, PG III, (60°C c.c.), MARINE POLLUTANT

**SEA (MARPOL 73/78 Convention - Annex II):**

**14.7. Maritime transport in bulk according to IMO instruments**
Not classified according to Annex II

**AIR (IATA)**

**14.1. UN Number:** 3082
**14.2. UN Proper Shipping Name (Technical Name):** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil)
**14.3. Transport Hazard Class(es):** 9
**14.4. Packing Group:** III
**14.5. Environmental Hazards:** Yes
**14.6. Special Precautions for users:**
**Label(s) / Mark(s):** 9, EHS
**Transport Document Name:** UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residual fuel oil), 9, PG III

## SECTION 15 REGULATORY INFORMATION

**REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS**

**Listed or exempt from listing/notification on the following chemical inventories :** AIIC, DSL, IECSC, TCSI, TSCA

**15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE**

**Applicable EU Directives and Regulations:**

1907/2006 [... on the Registration, Evaluation, Authorisation and Restriction of Chemicals ... and amendments thereto]

Annex XVII restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles identified in Regulation 1907/2006/EC [...on the Registration, Evaluation, Authorisation and Restrictions of Chemicals ... and amendments thereto]

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]

94/33/EC [...on the protection of young people at work]

96/82/EC as extended by 2003/105/EC [ ... on the control of major-accident hazards involving dangerous substances]. Product contains a substance that falls within the criteria defined in Annex I. Refer to Directive for details of requirements taking into account the volume of product stored on site.

2004/37/EC [... on the protection of workers from the risks related to carcinogens or mutagens...]

The Control of Substances Hazardous to Health (COSHH) Regulations [... protection of

workers from the risk related to chemical agents at work ...]. Refer to regulations for details of requirements.
1272/2008 [on classification, labelling and packaging of substances and mixtures.. and amendments thereto]

**REACH Restrictions on the manufacturing, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII):**
The following entries of Annex XVII may be considered for this product: 03, 28

### 15.2. CHEMICAL SAFETY ASSESSMENT

**REACH Information:** A Chemical Safety Assessment has been carried out for one or more substances present in the material.

## SECTION 16 OTHER INFORMATION

**IDENTIFIED USES:**
Manufacture of substance (PROC1, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3, SU8, SU9)
Distribution of substance (PROC3, PROC8a, PROC8b, SU3, SU8, SU9)
Use as an intermediate (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU3, SU8, SU9)
Formulation and (re)packing of substances and mixtures (PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b, SU10, SU3)
Use as a fuel - Industrial (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU3)
Use as a fuel - Professional (PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b, SU22)
Road and construction applications (PROC8a, PROC8b, SU22)

**REFERENCES:** Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, CONCAWE Product Dossiers, publications from other trade associations, such as the EU Hydrocarbon Solvents REACH Consortium, U.S. HPV Program Robust Summaries, the EU IUCLID Data Base, U.S. NTP publications, and other sources, as appropriate.

**List of abbreviations and acronyms that could be (but not necessarily are) used in this safety data sheet:**

| Acronym | Full text |
|---|---|
| N/A | Not applicable |
| N/D | Not determined |
| NE | Not established |
| VOC | Volatile Organic Compound |
| AIIC | Australian Inventory of Industrial Chemicals |
| AIHA WEEL | American Industrial Hygiene Association Workplace Environmental Exposure Limits |
| ASTM | ASTM International, originally known as the American Society for Testing and Materials (ASTM) |
| DSL | Domestic Substance List (Canada) |
| EINECS | European Inventory of Existing Commercial Substances |
| ELINCS | European List of Notified Chemical Substances |
| ENCS | Existing and new Chemical Substances (Japanese inventory) |
| IECSC | Inventory of Existing Chemical Substances in China |
| KECI | Korean Existing Chemicals Inventory |
| NDSL | Non-Domestic Substances List (Canada) |
| NZIoC | New Zealand Inventory of Chemicals |
| PICCS | Philippine Inventory of Chemicals and Chemical Substances |
| TLV | Threshold Limit Value (American Conference of Governmental Industrial Hygienists) |

| | |
|---|---|
| TSCA | Toxic Substances Control Act (U.S. inventory) |
| UVCB | Substances of Unknown or Variable composition, Complex reaction products or Biological materials |
| LC | Lethal Concentration |
| LD | Lethal Dose |
| LL | Lethal Loading |
| EC | Effective Concentration |
| EL | Effective Loading |
| NOEC | No Observable Effect Concentration |
| NOELR | No Observable Effect Loading Rate |

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**
Flam. Gas 1 H220: Extremely flammable gas; Flammable Gas, Cat 1
Press. Gas H280: Contains gas under pressure; may explode if heated; Pressurized Gas
Acute Tox. 2 H330: Fatal if inhaled; Acute Tox Inh, Cat 2
Acute Tox. 4 H332: Harmful if inhaled; Acute Tox Inh, Cat 4
Carc. 1B H350: May cause cancer; Carcinogenicity, Cat 1B
Repr. 2 H361d: Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
STOT RE 2 H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
Aquatic Acute 1 H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
Aquatic Chronic 1 H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
EUH066: Repeated exposure may cause skin dryness or cracking.

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**
Composition: Component Table for REACH information was modified.
Composition: Component Table information was modified.
Section 08: Exposure Limits Table information was modified.
Section 09 median particle size information was added.
Section 09: Freezing Point ºC(ºF) information was deleted.
Section 09: Melting Point C(F) information was deleted.
Section 11 EU Annex II Endocrine Disruptor Data information was added.
Section 12 EU Annex II Endocrine Disruptor Data information was added.
Section 13: European Waste Code Hazardous Note information was modified.
Section 2 EU Annex II Endocrine Disruptor Data information was added.
Section 9 melting and freezing points information was added.

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Internal Use Only
MHC: 0B, 0B, 2, 0, 1, 1 PPEC: E

DGN: 7111773XIE (1018676)

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**ANNEX**

| **Section 1 Exposure Scenario Title** | |
|---|---|
| **Title:** | |
| Manufacture of substance | |
| **Use Descriptor** | |
| Sector(s) of Use | SU10, SU3, SU8, SU9 |
| Process Categories | PROC1, PROC2, PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC1 |
| Specific Environmental Release Category | ESVOC 1.1.v1 |
| **Processes, tasks, activities covered** | |
| Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container). | |
| **Section 2 Operational conditions and risk management measures** | |
| **Section 2.1 Control of worker exposure** | |
| **Product Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7] | |
| **Contributing Scenarios/**<br>**Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**General exposures (closed systems) PROC1**<br>Handle substance within a closed system.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) Process sampling Outdoor. PROC2**<br>Sample via a closed loop or other system to avoid exposure. | |

Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**General exposures (closed systems) PROC3**
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Bulk product storage PROC2**
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Store substance within a closed system.
**Road tanker/rail car loading PROC8b**
Ensure material transfers are under containment or extract ventilation.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**marine vessel/barge (un)loading PROC8b**
Avoid carrying out activities involving exposure for more than 4 hours.
Transfer via enclosed lines
Clear transfer lines prior to de-coupling.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Equipment cleaning and maintenance PROC8a**
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

**Section 2.2 Control of environmental exposure**

**Product characteristics**

Predominantly hydrophobic.
Substance is complex UVCB.

**Duration, frequency and amount**

Annual site tonnage (tonnes/year): 600000 tons/yr
Continuous release.
Emission Days (days/year): 300 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.039
Maximum daily site tonnage (kg/d): 2000000 kg / day
Regional use tonnage (tonnes/year): 15000000 tons/yr

**Environmental factors not influenced by risk management**

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

**Other given operational conditions affecting environmental exposure**

Release fraction to air from process (initial release prior to RMM): 0.0001
Release fraction to soil from process (initial release prior to RMM): 0.0001
Release fraction to wastewater from process (initial release prior to RMM): 0.00000075

**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**

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =:
0 %
Risk from environmental exposure is driven by freshwater sediment.
Treat air emissions to provide a typical removal (or abatement?) efficiency of: 90 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency

| |
|---|
| of =: 87.3 % |
| **Organisation measures to prevent/limit release from site** |
| Do not apply industrial sludge to natural soils.<br>Prevent discharge of undissolved substance to or recover from wastewater.<br>Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** |
| Assumed domestic sewage treatment plant effluent flow is:[STP5] 10000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 2300000 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 89 % |
| Conditions and measures related to external treatment of waste for disposal |
| During manufacturing no waste of the substance is generated [ETW4] |
| Conditions and measures related to external recovery of waste |
| During manufacturing no waste of the substance is generated [ERW2] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21] |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |
| **4.2. Environment** |
| Further details on scaling and control technologies are provided in factsheet<br>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.<br>If scaling reveals a condition of unsafe use (i.e. RCRs >1), additional RMMs or a site-specific chemical safety assessment is required.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.<br>Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - 'Site-Specific Production' worksheet. [DSU6] |

| | |
|---|---|
| **Section 1 Exposure Scenario Title** | |
| **Title:** | |
| Distribution of substance | |
| **Use Descriptor** | |
| Sector(s) of Use | SU3, SU8, SU9 |
| Process Categories | PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC4, ERC6A, ERC6B, ERC6C, ERC6D, ERC7 |
| Specific Environmental Release Category | |
| **Processes, tasks, activities covered** | |
| Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities. | |
| **Section 2 Operational conditions and risk management measures** | |
| **Section 2.1 Control of worker exposure** | |
| **Product Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Assumes use at not more than 20°C above ambient temperature[G15] | |
| **Contributing Scenarios/<br>Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General exposures (closed systems) PROC3**<br>Handle substance within a closed system.<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Sample via a closed loop or other system to avoid exposure.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**marine vessel/barge (un)loading PROC8b**<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Transfer via enclosed lines<br>Clear transfer lines prior to de-coupling.<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Road tanker/rail car loading PROC8b**<br>Ensure material transfers are under containment or extract ventilation.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Equipment cleaning and maintenance PROC8a**<br>Drain down and flush system prior to equipment break-in or maintenance.<br>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle. | |
| **Section 2.2 Control of environmental exposure** | |
| **Product characteristics** | |
| Not applicable | |
| **Duration, frequency and amount** | |
| Not applicable | |
| **Environmental factors not influenced by risk management** | |
| Not applicable | |

| |
|---|
| **Other given operational conditions affecting environmental exposure** |
| Not applicable |
| **Technical conditions and measures at process level (source) to prevent release** |
| Not applicable |
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** |
| Not applicable |
| **Organisation measures to prevent/limit release from site** |
| Not applicable |
| **Conditions and measures related to municipal sewage treatment plant** |
| Not applicable |
| 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** |
| **3.1. Health** |
| Not applicable |
| **3.2. Environment** |
| Not applicable |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Not applicable |
| **4.2. Environment** |
| Not applicable |

| Section 1 Exposure Scenario Title | |
|---|---|
| **Title:** | |
| Use as an intermediate | |
| **Use Descriptor** | |
| Sector(s) of Use | SU3, SU8, SU9 |
| Process Categories | PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC6A |
| Specific Environmental Release Category | ESVOC 6.1a.v1 |
| **Processes, tasks, activities covered** | |
| Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container). | |
| **Section 2 Operational conditions and risk management measures** | |
| **Section 2.1 Control of worker exposure** | |
| **Product Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7] | |
| **Contributing Scenarios/<br>Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**General exposures (closed systems) PROC1**<br>Handle substance within a closed system.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) Process sampling Outdoor. PROC2**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 15 minutes.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) PROC3**<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Bulk product storage PROC2**<br>Store substance within a closed system.<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. | |

**Laboratory activities PROC15**
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Wear suitable gloves tested to EN374.
**marine vessel/barge (un)loading PROC8b**
Avoid carrying out activities involving exposure for more than 4 hours.
Transfer via enclosed lines
Clear transfer lines prior to de-coupling.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Road tanker/rail car loading PROC8b**
Avoid carrying out activities involving exposure for more than 1 hour.
or
Ensure material transfers are under containment or extract ventilation.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Equipment cleaning and maintenance PROC8a**
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

**Section 2.2 Control of environmental exposure**

**Product characteristics**

Predominantly hydrophobic.
Substance is complex UVCB.

**Duration, frequency and amount**

Annual site tonnage (tonnes/year): 15000 tons/yr
Continuous release.
Emission Days (days/year): 300 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.0014
Maximum daily site tonnage (kg/d): 50000 kg / day
Regional use tonnage (tonnes/year): 11000000 tons/yr

**Environmental factors not influenced by risk management**

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

**Other given operational conditions affecting environmental exposure**

Release fraction to air from process (initial release prior to RMM): 0.00001
Release fraction to soil from process (initial release prior to RMM): 0.001
Release fraction to wastewater from process (initial release prior to RMM): 0.0000068

**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**

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 %
Risk from environmental exposure is driven by freshwater sediment.
Treat air emissions to provide a typical removal (or abatement?) efficiency of: 80 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 88.3 %

**Organisation measures to prevent/limit release from site**

Do not apply industrial sludge to natural soils.
Prevent discharge of undissolved substance to or recover from wastewater.

| |
|---|
| Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** |
| Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 53000 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 89 % |
| Conditions and measures related to external treatment of waste for disposal |
| This substance is consumed during use and no waste of the substance is generated [ETW5] |
| Conditions and measures related to external recovery of waste |
| This substance is consumed during use and no waste of the substance is generated [ERW3] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21] |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |
| **4.2. Environment** |
| Further details on scaling and control technologies are provided in factsheet<br>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.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |

| Section 1 Exposure Scenario Title | |
|---|---|
| **Title:** | |
| Formulation and (re)packing of substances and mixtures | |
| **Use Descriptor** | |
| Sector(s) of Use | SU10, SU3 |
| Process Categories | PROC1, PROC15, PROC2, PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC2 |
| Specific Environmental Release Category | ESVOC 2.2.v1 |
| **Processes, tasks, activities covered** | |
| 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 Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Assumes use at not more than 20°C above ambient temperature[G15] | |
| **Contributing Scenarios/<br>Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**General exposures (closed systems) PROC1**<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) Process sampling PROC2**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 15 minutes.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) PROC3**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Bulk product storage PROC2**<br>Store substance within a closed system.<br>Avoid carrying out activities involving exposure for more than 4 hours. | |

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Product Sampling PROC2**
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Laboratory activities PROC15**
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Wear suitable gloves tested to EN374.
**marine vessel/barge (un)loading PROC8b**
Transfer via enclosed lines
Avoid carrying out activities involving exposure for more than 4 hours.
Clear transfer lines prior to de-coupling.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Road tanker/rail car loading PROC8b**
Ensure material transfers are under containment or extract ventilation.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Drum/batch transfers PROC8b**
Ensure material transfers are under containment or extract ventilation.
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
or
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 1 hour.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Equipment cleaning and maintenance PROC8a**
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

**Section 2.2 Control of environmental exposure**

**Product characteristics**

Predominantly hydrophobic.
Substance is complex UVCB.

**Duration, frequency and amount**

Annual site tonnage (tonnes/year): 30000 tons/yr
Continuous release.
Emission Days (days/year): 300 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.0025
Maximum daily site tonnage (kg/d): 100000 kg / day
Regional use tonnage (tonnes/year): 12000000 tons/yr

**Environmental factors not influenced by risk management**

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

**Other given operational conditions affecting environmental exposure**

Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): [OOC11] 0.0000002
Release fraction to soil from process (initial release prior to RMM): 0.0001
Release fraction to wastewater from process (initial release prior to RMM): 0.0000034

**Technical conditions and measures at process level (source) to prevent release**

Common practices vary across sites thus conservative process release estimates used.

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|---|
| **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil** |
| If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.<br>If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =:<br>0 %<br>Risk from environmental exposure is driven by freshwater sediment.<br>Treat air emissions to provide a typical removal (or abatement?) efficiency of: 0 %<br>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: 88.3 % |
| **Organisation measures to prevent/limit release from site** |
| Do not apply industrial sludge to natural soils.<br>Prevent discharge of undissolved substance to or recover from wastewater.<br>Sludge should be incinerated, contained or reclaimed. |
| **Conditions and measures related to municipal sewage treatment plant** |
| Assumed domestic sewage treatment plant effluent flow is:[STP5] 2000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 110000 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 89 % |
| 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 [ETW3] |
| Conditions and measures related to external recovery of waste |
| External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21] |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |
| **4.2. Environment** |
| Further details on scaling and control technologies are provided in factsheet<br>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.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |

| Section 1 Exposure Scenario Title | |
|---|---|
| **Title:** | |
| Use as a fuel - Industrial | |
| **Use Descriptor** | |
| Sector(s) of Use | SU3 |
| Process Categories | PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC7 |
| Specific Environmental Release Category | ESVOC 7.12a.v1 |
| **Processes, tasks, activities covered** | |
| 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 Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Assumes use at not more than 20°C above ambient temperature[G15]<br>No exposure assessment presented for human health. [G39] | |
| **Contributing Scenarios/<br>Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**General exposures (closed systems) PROC1**<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) Product Sampling PROC2**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 1 hour.<br>provide a good standard of controlled ventilation (10 to 15 air changes per hour).<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) PROC3**<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Outdoor. Bulk closed unloading PROC8b**<br>Transfer via enclosed lines<br>Avoid carrying out activities involving exposure for more than 4 hours.<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. | |

**Drum/batch transfers PROC8b**
Ensure material transfers are under containment or extract ventilation.
or
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Operation of solids filtering equipment PROC2**
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Bulk product storage PROC2**
Store substance within a closed system.
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Use as a fuel (closed systems) PROC16**
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Equipment cleaning and maintenance PROC8a**
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

**Section 2.2 Control of environmental exposure**

**Product characteristics**

Predominantly hydrophobic.
Substance is complex UVCB.

**Duration, frequency and amount**

Annual site tonnage (tonnes/year): 1500000 tons/yr
Continuous release.
Emission Days (days/year): 300 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.2
Maximum daily site tonnage (kg/d): 5000000 kg / day
Regional use tonnage (tonnes/year): 7600000 tons/yr

**Environmental factors not influenced by risk management**

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

**Other given operational conditions affecting environmental exposure**

Release fraction to air from process (initial release prior to RMM): 0.0005
Release fraction to soil from process (initial release prior to RMM): 0
Release fraction to wastewater from process (initial release prior to RMM): 0.00001

**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**

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0 %
Risk from environmental exposure is driven by freshwater sediment.
Treat air emissions to provide a typical removal (or abatement?) efficiency of: 95 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 88.6 %

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| **Organisation 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 effluent flow is:[STP5] 2000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 5200000 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is =: 89 % |
| Conditions and measures related to external treatment of waste for disposal |
| Combustion emissions considered in regional exposure assessment [ETW2]<br>Combustion emissions limited by required exhaust emission controls [ETW1]<br>External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3] |
| Conditions and measures related to external recovery of waste |
| This substance is consumed during use and no waste of the substance is generated [ERW3] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| Not applicable |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |
| **4.2. Environment** |
| Further details on scaling and control technologies are provided in factsheet<br>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.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |

| | |
|---|---|
| **Section 1 Exposure Scenario Title** | |
| **Title:** | |
| Use as a fuel - Professional | |
| **Use Descriptor** | |
| Sector(s) of Use | SU22 |
| Process Categories | PROC1, PROC16, PROC2, PROC3, PROC8a, PROC8b |
| Environmental Release Categories | ERC9A, ERC9B |
| Specific Environmental Release Category | ESVOC 9.12b.v1 |
| **Processes, tasks, activities covered** | |
| 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 Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Assumes use at not more than 20°C above ambient temperature[G15] | |
| **Contributing Scenarios/<br>Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**General exposures (closed systems) PROC1**<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**General exposures (closed systems) Product Sampling PROC2**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 1 hour.<br>provide a good standard of controlled ventilation (10 to 15 air changes per hour).<br>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>**General exposures (closed systems) PROC3**<br>Handle substance within a closed system.<br>Sample via a closed loop or other system to avoid exposure.<br>Avoid carrying out activities involving exposure for more than 1 hour.<br>provide a good standard of controlled ventilation (10 to 15 air changes per hour).<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>**Bulk closed unloading PROC8b**<br>provide a good standard of controlled ventilation (10 to 15 air changes per hour). | |

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
or
Ensure material transfers are under containment or extract ventilation.
**Drum/batch transfers PROC8b**
provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
or
Ensure material transfers are under containment or extract ventilation.
**refuelling PROC8b**
Ensure material transfers are under containment or extract ventilation.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
**Use as a fuel (closed systems) PROC16**
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
**Equipment cleaning and maintenance PROC8a**
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Clear spills immediately.
**General exposures (closed systems) PROC2**
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

## Section 2.2 Control of environmental exposure

**Product characteristics**

Predominantly hydrophobic.
Substance is complex UVCB.

**Duration, frequency and amount**

Annual site tonnage (tonnes/year): 1300 tons/yr
Continuous release.
Emission Days (days/year): 365 days/yr
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used Locally: 0.0005
Maximum daily site tonnage (kg/d): 3500 kg / day
Regional use tonnage (tonnes/year): 2600000 tons/yr

**Environmental factors not influenced by risk management**

Local freshwater dilution factor [EF1] 10
Local marine water dilution factor: [EF2] 100

**Other given operational conditions affecting environmental exposure**

Release fraction to air from wide dispersive use (regional only): 0.0001
Release fraction to soil from wide dispersive use (regional only): 0.00001
Release fraction to wastewater from wide dispersive use: 0.00001

**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**

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0

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| No secondary wastewater treatment required.<br>Risk from environmental exposure is driven by freshwater sediment.<br>Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable<br>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 66.1 % |
| **Organisation 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 effluent flow is:[STP5] 2000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 11000 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 89 % |
| Conditions and measures related to external treatment of waste for disposal |
| Combustion emissions considered in regional exposure assessment [ETW2]<br>Combustion emissions limited by required exhaust emission controls [ETW1]<br>External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3] |
| Conditions and measures related to external recovery of waste |
| This substance is consumed during use and no waste of the substance is generated [ERW3] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21] |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |
| **4.2. Environment** |
| Further details on scaling and control technologies are provided in factsheet<br>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.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |

| | |
|---|---|
| **Section 1 Exposure Scenario Title** | |
| **Title:** | |
| Road and construction applications | |
| **Use Descriptor** | |
| Sector(s) of Use | SU22 |
| Process Categories | PROC8a, PROC8b |
| Environmental Release Categories | |
| Specific Environmental Release Category | ESVOC 8.15.v1 |
| **Processes, tasks, activities covered** | |
| Bulk loading (including marine vessel/barge, rail/road car and IBC loading) | |
| **Section 2 Operational conditions and risk management measures** | |
| **Section 2.1 Control of worker exposure** | |
| **Product Characteristic** | |
| Liquid | |
| **Duration, frequency and amount** | |
| Covers daily exposures up to 8 hours (unless stated differently)[G2]<br>Covers percentage substance in the product up to 100 %[G13 ] | |
| **Other given operational conditions affecting workers exposure** | |
| Assumes a good basic standard of occupational hygiene is implemented [G1]<br>Operation is carried out at elevated temperature (>20 C above ambient temperature)[OC7] | |
| **Contributing Scenarios/**<br>**Specific Risk Management Measures and Operating Conditions**<br>(only required controls to demonstrate safe use listed) | |
| **General measures (carcinogens)**<br>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 scenario; 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.<br>**Material transfers PROC8b**<br>Ensure material transfers are under containment or extract ventilation.<br>Limit the substance content in the mixture to 1 %.<br>Avoid carrying out activities involving exposure for more than 15 minutes.<br>Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.<br>**Equipment cleaning and maintenance PROC8a**<br>Drain down and flush system prior to equipment break-in or maintenance.<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle.<br>Clear spills immediately.<br>Avoid carrying out activities involving exposure for more than 15 minutes.<br>Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.<br>Limit the substance content in the mixture to 1 %. | |
| **Section 2.2 Control of environmental exposure** | |
| **Product characteristics** | |
| Predominantly hydrophobic.<br>Substance is complex UVCB. | |
| **Duration, frequency and amount** | |

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|---|
| Annual site tonnage (tonnes/year): 1.2 tons/yr<br>Continuous release.<br>Emission Days (days/year): 365 days/yr<br>Fraction of EU tonnage used in region: 0.1<br>Fraction of Regional tonnage used Locally: 0.0005<br>Maximum daily site tonnage (kg/d): 3.3 kg / day<br>Regional use tonnage (tonnes/year): 2400 tons/yr |
| **Environmental factors not influenced by risk management** |
| Local freshwater dilution factor [EF1] 10<br>Local marine water dilution factor: [EF2] 100 |
| **Other given operational conditions affecting environmental exposure** |
| Release fraction to air from wide dispersive use (regional only): 0.95<br>Release fraction to soil from wide dispersive use (regional only): 0.04<br>Release fraction to wastewater from wide dispersive use: 0.01 |
| **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** |
| If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.<br>If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of =: >= 0<br>Risk from environmental exposure is driven by freshwater sediment.<br>Treat air emissions to provide a typical removal (or abatement?) efficiency of: Not Applicable<br>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal (or abatement) efficiency of =: >= 65.6 % |
| **Organisation 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 effluent flow is:[STP5] 2000 m3/day<br>Estimated substance removal from wastewater via domestic sewage treatment is: 89 %<br>Not applicable as there is no release to wastewater.<br>The maximum allowable site tonnage (MSafe) based on domestic sewage plant effluent release is: 10 kg / day<br>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs is: 89 % |
| 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 [ETW3] |
| Conditions and measures related to external recovery of waste |
| External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1] |
| **Section 3 Exposure Estimation** |
| **3.1. Health** |
| The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21] |
| **3.2. Environment** |
| The Hydrocarbon Block Method has been used to calculate environmental exposrue with the Petrorisk model.[EE2] |
| **Section 4 Guidance to check compliance with the Exposure Scenario** |
| **4.1. Health** |
| Available hazard data do not enable the derivation of a DNEL for carcinogenic effects[G33]<br>Available hazard data do not support the need for a DNEL to be established for other health effects.[G36]<br>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. [G22]<br>Risk Management Measures are based on qualitative risk characterisation. [G37]<br>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.[G23] |

| **4.2. Environment** |
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| Further details on scaling and control technologies are provided in factsheet<br>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.<br>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.<br>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. |