



**SAFETY DATA SHEET**  
according to Regulation (EC) No. 1907/2006

SDS # : A13373

**LOW SULFUR FUEL OIL (UN  
3082)**

Date of the previous version: 2020-07-08

Revision Date: 2020-07-10

Version 2

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE  
COMPANY/UNDERTAKING

1.1. Product identifier

<b>Product name</b>	<b>LOW SULFUR FUEL OIL (UN 3082)</b>
<b>REACH Registration Name</b>	Fuel oil, residual.
<b>REACH registration No</b>	01-2119474894-22
<b>Substance/mixture</b>	Substance

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

<b>Identified uses</b>	Manufacture of substances, Distribution of substance, Formulation & (re)packing of substances and mixtures, Use as an intermediate, Fuel used in marine applications : diesel engines and boilers.
------------------------	--

1.3. Details of the supplier of the safety data sheet

<b>Supplier</b>	TOTAL MARINE FUELS GLOBAL SOLUTIONS 182 Cecil Street #27-01 Frasers Tower Singapore 069547 Tel : +65 6849 5266 Fax : +65 6337 9483
-----------------	---

For further information, please contact:

<b>Contact Point</b>	HSE
<b>E-mail Address</b>	rm.mkefr-fds@total.com

1.4. Emergency telephone number

Emergency telephone: +44 1235 239670

See section 16 for additional information

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

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

*For the full text of the H-Statements mentioned in this Section, see Section 2.2.*



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

Acute inhalation toxicity - dust/mist - Category 4 - (H332)  
 Carcinogenicity - Category 1B - (H350)  
 Reproductive toxicity - Category 2 - (H361d)  
 Specific target organ toxicity (repeated exposure) - Category 2 - (H373)  
 Acute aquatic toxicity - Category 1 - (H400)  
 Chronic aquatic toxicity - Category 1 - (H410)

### 2.2. Label elements

**Labelled according to** REGULATION (EC) No 1272/2008

Contains Fuel oil, residual

**EC-No** 270-675-6



**Signal word**  
DANGER

#### Hazard Statements

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  
 H410 - Very toxic to aquatic life with long lasting effects

#### Precautionary Statements

P201 - Obtain special instructions before use  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  
 P243 - Take precautionary measures against static discharge  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower  
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
 P314 - Get medical advice/attention if you feel unwell  
 P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
 P273 - Avoid release to the environment  
 P501 - Dispose of contents/ container to an approved waste disposal plant

#### Supplemental Hazard Statements

EUH066 - Repeated exposure may cause skin dryness or cracking



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

### 2.3. Other hazards

#### Physical-Chemical Properties

In the presence of hot spots, there is a special risk of fire or explosion under certain conditions involving accidental release of vapor or leaks of product under pressure.

#### Properties Affecting Health

Contact with hot product will cause thermal burns.  
Vapors or mists are irritating for mucous membranes, notably in the eyes.  
Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations.

### Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1. Substance

##### Chemical nature

A complex and variable combination of paraffinic, cyclic and aromatic hydrocarbons having a carbon number range predominantly of C15 to C50 and boiling in the range of approximately 150°C to 750°C. They may contain sulphurated derivatives and organic acids. This product contains polycyclic aromatic hydrocarbons (PAH), some of which are considered carcinogens.

Chemical Name	EC-No	REACH registration No	CAS-No	Weight %	Classification (Reg. 1272/2008)
Fuel oil, residual	270-675-6	01-2119474894-22	68476-33-5	100	Carc. 1B (H350) Repr. 2 (H361d) Acute Tox. 4 (H332) STOT RE 2 (H373) Aquatic Acute 1 (H400) Aquatic chronic 1 (H410)

##### Additional information

Sulphur: < 0.5%.  
Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

### Section 4: FIRST AID MEASURES

#### 4.1. Description of first-aid measures

##### General advice

IN CASE OF SERIOUS OR PERSISTENT CONDITIONS, CALL A DOCTOR OR EMERGENCY MEDICAL CARE.

If there is any suspicion of inhalation of H<sub>2</sub>S. Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.

##### Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If irritation, blurred vision or swelling occurs and persists. Obtain medical advice from a specialist.

In case of contact with the hot product, COOL THE EYE IMMEDIATELY AND COPIOUSLY WITH COLD WATER for 10 minutes, keeping the eye open if possible. Take the person to



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

a specialised medical centre.

### Skin contact

Immediately remove all stained or splashed clothing that is not adhering to the skin. Remove as much as possible by wiping. If necessary, use a fatty substance of animal or vegetable origin. Never use gasoline, kerosene or other solvents for washing of contaminated skin. Wash affected area with soap and water. Seek medical attention if skin irritation, swelling or redness develops and persists.

When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention.

For minor thermal burns. Hold the burned area under cold running water for at least five minutes, or until the pain subsides. Do not puncture blisters. DO NOT attempt to remove portions of clothing glued to burnt skin but cut round them.

Seek medical attention in all cases of serious burns. In this case, the casualty should be sent immediately to hospital.

### Inhalation

In case of exposure to intense concentrations of vapours, fumes or spray, transport the person away from the contaminated zone, keep warm and allow to rest.

Immediately begin artificial respiration if breathing has ceased. Call a physician immediately.

If there is any suspicion of inhalation of H<sub>2</sub>S. Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures. If not breathing, give artificial respiration. Provision of oxygen may help. Remove casualty to fresh air as quickly as possible.

### Ingestion

Do NOT induce vomiting. Give nothing to drink. Never give anything by mouth to an unconscious person.

Consult a physician.

### Protection of First-aiders

CAUTION! First aid personnel must be aware of personal risk during rescue!. Use personal protective equipment. See Section 8 for more detail.

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

### Eye contact

Burning feeling and temporary redness. Risk of burns ( if the product is hot). Vapor may cause irritation.

### Skin contact

Risk of burns ( if the product is hot). Prolonged or repeated contact may dry skin and cause irritation.

### Inhalation

Inhalation of vapors in high concentration may cause irritation of respiratory system. Causes headache, drowsiness or other effects to the central nervous system. Risk of hydrogen sulphide intoxication (H<sub>2</sub>S).

### Ingestion

Not an expected route of exposure. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

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

### Notes to physician

Treat symptomatically.

In the case of thermal burns. DO NOT attempt to remove portions of clothing glued to burnt skin but cut round them.

SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

### Section 5: FIRE-FIGHTING MEASURES

#### 5.1. Extinguishing media

<b>Suitable Extinguishing Media</b>	Extinguishing media - large fires: Foam (specifically trained person only). Water fog (trained personnel only). Extinguishing media - small fires: Carbon dioxide (CO <sub>2</sub> ). Dry powder. Sand or earth. Other inert gases (subject to regulations).
<b>Unsuitable Extinguishing Media</b>	Do not use direct water jets on the burning product. they could cause splattering and spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

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

<b>Special Hazard</b>	Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including carbon monoxide. unidentified organic and inorganic compounds. If sulphur compounds are present in appreciable amounts, combustion products may include also H <sub>2</sub> S and SO <sub>x</sub> (sulfur oxides) or sulfuric acid.
-----------------------	--

#### 5.3. Advice for fire-fighters

<b>Special protective equipment for fire-fighters</b>	In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
<b>Other information</b>	Do not allow run-off from fire fighting to enter drains or water courses.

### Section 6: ACCIDENTAL RELEASE MEASURES

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

<b>General Information</b>	Except in case of small spillages, The feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency. If required, notify relevant authorities according to all applicable regulations. When the presence of dangerous amounts of H <sub>2</sub> S around the spilled product is suspected or proved. additional or special actions may be warranted to determine controls appropriate to local circumstances. Evacuate non-essential personnel. Avoid direct contact with released material. Stop or contain leak at the source, if safe to do so. Avoid contact with skin, eyes and inhalation of vapors. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Ensure adequate ventilation, especially in confined areas. For personal protection see section 8.
<b>Advice for non-emergency personnel</b>	Do not touch or walk through spilled material. Evacuate personnel to safe areas. Ensure adequate ventilation. For personal protection see section 8.

SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

**Advice for emergency responders** Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. Use personal protective equipment.

In case of:

- Small spillages: normal antistatic working clothes are usually adequate. For personal protection see section 8.
- Large spillages: full body suit of chemically resistant and antistatic material. Work gloves (preferably gauntlets) providing adequate chemical resistance. Remarks:.. Gloves made of PVA are not water-resistant, and are not suitable for emergency use. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated.
- Work helmet. Antistatic non-skid safety shoes or boots, if necessary heat-resistant.
- Goggles and/or face shield, if splashes or contact with eyes is possible or anticipated.
- A half or full-face respirator with filter(s) for organic vapours (and when applicable: for H2S). If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

### 6.2. Environmental precautions

**General Information** The product should not be allowed to enter drains, water courses or the soil. Solidified product may clog drains and sewers. If necessary. Consult an expert. Local authorities should be advised if significant spillages cannot be contained.

### 6.3. Methods and material for containment and cleaning up

**Methods for containment** control the spreading of the spillage. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Ensure adequate ventilation, especially in confined areas. Large spillages may be cautiously covered with foam, if available, to limit fire risk.

**Methods for cleaning up** Let hot product cool down naturally. Collect free product with suitable means. Use mechanical means such as pumps, skimmers and absorbent materials, Pick up and transfer to properly labeled containers. Cleaning with high pressure washers, or, Wash off with warm water. Wear respiratory protection.

In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations. Transfer recovered product and other materials to suitable tanks or containers and store/dispose according to relevant regulations.

In case of spillage in the water:

- Product less dense than water. In case of small spillages in closed waters , contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents, control the spreading of the spillage.
- If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. collect the product by skimming or other suitable mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities. Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal.
- Product which is denser than water will sink to the bottom, and usually no intervention will be feasible. If possible, collect the product and contaminated materials with mechanical means, and store/dispose of according to relevant regulations. In special situations (to be assessed on case-by case basis, according to expert judgement and local conditions), excavations of trenches on the bottom to collect the product, or burying the product with sand may be a feasible option.

SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

### 6.4. Reference to other sections

**Personal Protective Equipment** See Section 8 for more detail.

**Waste treatment** See section 13.

**Other information** Recommended measures are based on the most likely spillage scenarios for this material. However, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken. Cut off the electric power supply if this operation causes no sparks in the area containing vapors from the product.

Concentration of H<sub>2</sub>S in tank headspaces may reach hazardous values, especially in case of prolonged storage. This situation is especially relevant for those operations which involve direct exposure to the vapours in the tank. Spillages of limited amounts of products, especially in the open air when vapours will be usually quickly dispersed, are dynamic situations, which presumably do not entail exposure to dangerous concentrations.

As H<sub>2</sub>S has a density greater than ambient air, a possible exception may regard the build-up of dangerous concentrations in specific spots, like trenches, depressions or confined spaces. In all these circumstances, however, the correct actions should be assessed on a case-by-case basis.

## Section 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

**Advice on safe handling** Handle in accordance with good industrial hygiene and safety practice. Hydrogen sulphide can accumulate in the head space of storage tanks containing this product and can reach potentially hazardous concentrations. Wear personal protective equipment. Refer to Section 8.

Take precautionary measures against static electricity.

The inspection, cleaning and maintenance of storage containers require the application of strict procedures and must be entrusted to qualified personnel (internal or external).

Avoid splash filling of bulk volumes when handling hot liquid product. Keep the temperature of the product as low as possible to minimise the release of fumes. Never check the tank level by using a naked flame.

Do not smoke. Avoid breathing vapors or mists. Ensure adequate ventilation. Vapors may form explosive mixtures with air.

Avoid contact with skin, eyes and clothing. Wear suitable protective clothing.

Do not use compressed air for filling, discharging, or handling operations.

**Technical measures** Prevent the formation of vapors, mists and aerosols. Ensure adequate ventilation.

Do not use compressed air for filling, discharging, or handling operations.

Design installations to avoid spills and splashes of hot product. Take all necessary precautions to prevent water from entering the containers, tanks, transfer lines etc...

Keep away from food, drink and animal feedingstuffs.

**Prevention of fire and explosion** Adjust storage temperature to the lowest possible, whilst ensuring that it is maintained at greater than the 10 °C pour point, AND DOES NOT EXCEED 70 °C.

NEVER heat a reservoir or tank if the heating elements are not adequately immersed (minimum 15 cm).

SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

Take precautionary measures against static discharges. Ground/bond containers, tanks and transfer/receiving equipment. Never weld any container or empty pipe that has not been degassed.

Do not heat the pumps or pipes using an open flame.

### Hygiene measures

Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. Avoid contact with skin, eyes and clothing. Use personal protective equipment as required.

Remove as much as possible by wiping. If small amount of product only comes into contact with the skin, remove with vegetable oil. White oil, lukewarm paraffin or a suitable soap recommended for this purpose may also be used.

Do not use abrasives, solvents or fuels.

Do not put product contaminated rags into workwear pockets.

Do not eat, drink or smoke when using this product. Change contaminated clothes at the end of working shift. Wash hands before breaks and immediately after handling the product.

Gloves must be periodically inspected and changed in case of wear, perforations or contaminations. Avoid breathing vapors, mist or gas.

### 7.2. Conditions for safe storage, including any incompatibilities

#### Technical measures/Storage conditions

Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation.

. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content and flammability. If sulphur compounds are suspected to be present in the product, check the atmosphere for H<sub>2</sub>S content. Use adequate personal protective equipment as needed.

. Take precautionary measures against static discharges. Ensure all equipment is electrically grounded before beginning transfer operations. Storage installations should be designed with adequate bunds so as to prevent ground or water pollution in case of leaks or spills. Do not remove the hazard labels of the containers (even if they are empty). Store the packed products (drums, samples, cans ...) in properly ventilated rooms, away from damp, heat and any potential source of ignition. Lines used for the product and pump devices are to be insulated and equipped with a heating device.

. Keep containers tightly closed and properly labelled. Keep preferably in the original container. Otherwise reproduce all indication of the regulation label on the new container. Store separately from oxidising agents.

. Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned. Empty containers may contain combustible product residues.

. Store in accordance with the particular national regulations.

#### Materials to Avoid

Strong oxidizing agents, Strong acids, Halogens.

#### Packaging material

Use only containers, seals, pipes, etc... made in a material suitable for use with aromatic hydrocarbons. heat resistant. Recommended materials for containers, or container linings use mild steel, stainless steel. Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

#### Further information

Ensure that all relevant regulations regarding handling and storage facilities of flammable products are followed.

### 7.3. Specific end uses





SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

**Specific use(s)** See exposure scenarios.

### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1. Control parameters

**Exposure limits** Hydrogen sulphide (EU): OEL = 7 mg/m<sup>3</sup>, 5ppm (8 h), 14 mg/m<sup>3</sup>, 10ppm (short-time)

**Legend** See section 16

#### Derived No Effect Level (DNEL)

##### DNEL Worker (Industrial/Professional)

Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Fuel oil, residual 68476-33-5	4716.8 mg/m <sup>3</sup> (Inhalation)		0.18 mg/m <sup>3</sup> (Inhalation)	0.065 mg/kg/8h (dermal)

##### DNEL General population

Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Fuel oil, residual 68476-33-5			0.015 mg/kg/24h (oral)	

#### Predicted No Effect Concentration (PNEC)

Chemical Name	Water	Sediment	Soil	Air	STP	Oral
Fuel oil, residual 68476-33-5						66.7 mg/kg food

#### 8.2. Exposure controls

##### Occupational Exposure Controls

###### Engineering Measures

Ensure adequate ventilation. Do not enter empty storage tanks until measurements of available oxygen have been carried out. When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

###### Personal Protective Equipment

###### General Information

Protective engineering solutions should be implemented and in use before personal protective equipment is considered.  
Use personal protective equipment in good condition.

###### Respiratory protection

Do not breathe vapors, mist or gas.  
. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Breathing apparatus with filter. Type A.  
. The use of breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses.



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

<b>Eye Protection</b>	Wear safety glasses with side shields (or goggles). Face-shield.
<b>Skin and body protection</b>	Wear suitable protective clothing. hydrocarbon-proof clothing. Protective shoes or boots.
<b>Hand Protection</b>	Hydrocarbon-proof gloves. Nitrile rubber. Neoprene gloves. . Wear suitable gloves tested to EN374. . Gloves anti-heat for the liquefied product (EN 407, level 1). . Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

### Environmental exposure controls

**General Information** The product should not be allowed to enter drains, water courses or the soil.

### Section 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on basic physical and chemical properties

<b>Appearance</b>		viscous	
<b>Color</b>		brown dark green or dark brown black	
<b>Physical State @20°C</b>		viscous	
<b>Odor</b>		Hydrocarbon-like	
<b>Odor Threshold</b>		No information available	
<b>Property</b>	<b>Values</b>	<b>Remarks</b>	<b>Method</b>
<b>pH</b>		Not applicable	
<b>Melting point/range</b>		No information available	
<b>Boiling point/boiling range</b>	<b>160 - 750 °C</b> 320 - 1382 °F		EN 15199 EN 15199
<b>Flash point</b>	<b>&gt; 60 °C</b> > 140 °F		ASTM D 93 ASTM D 93
<b>Evaporation rate</b>		No information available	
<b>Flammability Limits in Air</b>		No information available	
<b>Vapor Pressure</b>	< 1 kPa	@ 150 °C	EN 13016-1
<b>Vapor density</b>		No information available	
<b>Relative density</b>		No information available	
<b>Density</b>	840 - 1100 kg/m <sup>3</sup>	@ 15 °C	
<b>Water solubility</b>		Insoluble	
<b>Solubility in other solvents</b>		Soluble in many common organic solvents	
<b>logPow</b>		Not applicable	
<b>Autoignition temperature</b>	<b>220 - 550 °C</b> 428 - 1022 °F		DIN 51794 DIN 51794
<b>Decomposition temperature</b>		No information available	
<b>Viscosity, kinematic</b>	30 - 700 mm <sup>2</sup> /s	@ 50 °C	ISO 3104
<b>Viscosity, dynamic</b>		No information available	



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

<b>Explosive properties</b>	Not considered explosive based on chemical structure and oxygen balance considerations
<b>Oxidizing Properties</b>	This product is not considered oxidising based on chemical structure considerations
<b>Possibility of hazardous reactions</b>	None under normal processing

### 9.2. Other information

**Freezing Point** No information available

## Section 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

**General Information** No information available.

### 10.2. Chemical stability

**Stability** Stable under recommended storage conditions.

### 10.3. Possibility of hazardous reactions

**Hazardous Reactions** None under normal processing.

### 10.4. Conditions to avoid

**Conditions to avoid** Take precautionary measures against static discharges. Keep away from open flames, hot surfaces and sources of ignition.

### 10.5. Incompatible materials

**Materials to Avoid** Strong oxidizing agents, Strong acids, Halogens.

### 10.6. Hazardous Decomposition Products

**Hazardous Decomposition Products** None under normal use.

## Section 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects

#### **Acute toxicity Local effects Product Information**

**Skin contact** This substance does not meet the EU criteria for classification.  
Risk of burns ( if the product is hot). Prolonged or repeated contact may dry skin and cause irritation.

**Eye contact** This substance does not meet the EU criteria for classification.  
Burning feeling and temporary redness. Risk of burns ( if the product is hot).



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

Vapor may cause irritation.

**Inhalation**

. Inhalation of vapors in high concentration may cause irritation of respiratory system. Causes headache, drowsiness or other effects to the central nervous system. Risk of hydrogen sulphide intoxication (H<sub>2</sub>S).

**Ingestion**

This substance does not meet the EU criteria for classification.  
Not an expected route of exposure. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

ATEmix (inhalation-dust/mist) 4.10 mg/l

**Acute toxicity - Component Information**

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Fuel oil, residual	LD50 5270 mg/kg bw (rat - OECD 401)	LD50 > 2000 mg/kg bw (rabbit - OECD 434)	LC50(4h) 4.1 mg/l (males - aerosol - rat) LC50(4h) 4.5 mg/l (females - aerosol - rat)

**Sensitization****Sensitization**

This substance does not meet the EU criteria for classification.

**Specific effects****Carcinogenicity**

May cause cancer.  
Contains substance(s) listed as carcinogen:

Chemical Name	European Union
Fuel oil, residual 68476-33-5	Carc. 1B (H350)

**Mutagenicity**

This substance does not meet the EU criteria for classification.

**Reproductive toxicity**

Suspected of damaging fertility or the unborn child.  
Contains a known or suspected reproductive toxin;

Chemical Name	European Union
Fuel oil, residual 68476-33-5	Repr. 2 (H361d)

**Repeated dose toxicity****Target Organ Effects (STOT)****Specific target organ systemic toxicity (single exposure)**

This substance does not meet the EU criteria for classification.

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

May cause damage to organs through prolonged or repeated exposure. Target Organs: Blood. Thymus. Liver. Repeated exposure may cause skin dryness or cracking.

**Aspiration toxicity**

This substance does not meet the EU criteria for classification.

**Other information****Other information**

No information available.

SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

### Section 12: ECOLOGICAL INFORMATION

#### 12.1. Toxicity

Very toxic to aquatic life with long lasting effects.

##### Acute aquatic toxicity - Product Information

Not applicable.

##### Acute aquatic toxicity - Component Information

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Fuel oil, residual 68476-33-5	EL50(72h) 0.32 mg/l (Pseudokirchnerella subcapitata - OECD 201)	EL50(48h) 0.22 mg/l (Daphnia magna - OECD 202)	LL50 (96h) 79 mg/l (Oncorhynchus mykiss - OECD 203)	

##### Chronic aquatic toxicity - Product Information

Not applicable.

##### Chronic aquatic toxicity - Component Information

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Fuel oil, residual 68476-33-5		NOEL (21d) 0.27 mg/l (Daphnia magna - QSAR Petrotox)	NOEL (14/28d) 0.1 mg/l (Oncorhynchus mykiss - QSAR Petrotox)	

##### Effects on terrestrial organisms

No information available.

#### 12.2. Persistence and degradability

##### General Information

Substance is a UVCB. Standard tests for this endpoint are not appropriate

#### 12.3. Bioaccumulative potential

##### Product Information

Substance is a UVCB. Standard tests for this endpoint are not appropriate.

##### logPow

Not applicable

##### Component Information

No information available.

#### 12.4. Mobility in soil

Mobility				
Method	Compartment	Result	(%)	Remarks
Percent distribution in media (Calculation according to Mackay,	Soil		67.81	



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

Level III)				
Percent distribution in media (Calculation according to Mackay, Level III)	Sediment		27.63	
Percent distribution in media (Calculation according to Mackay, Level III)	Air		4.55	
Percent distribution in media (Calculation according to Mackay, Level III)	Water		0.01	

**Soil** Given its physical and chemical characteristics, the product generally shows low soil mobility.

**Air** Loss by evaporation is limited.

**Water** The product floats or settles, depending on its density.

### 12.5. Results of PBT and vPvB assessment

**PBT and vPvB assessment** This product contains no substance considered as PBT and/or vPvB according to REACH regulation annex XIII criteria.

### 12.6. Other adverse effects

**General Information** No information available.

## Section 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Waste from Residues / Unused Products** Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of contents/ container to an approved incineration plant.

**Contaminated packaging** Empty containers should be taken to an approved waste handling site for recycling or disposal.

**EWC Waste Disposal No.** According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

## Section 14: TRANSPORT INFORMATION

### ADR/RID

<b>UN/ID No</b>	UN3082
<b>Proper shipping name</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>ADR/RID-Labels</b>	9
<b>Environmental hazard</b>	Yes



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

<b>Classification Code</b>	M6
<b>Special Provisions</b>	274, 335, 601, 375
<b>ADR Hazard Id (Kemmler Number)</b>	90
<b>Description</b>	UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual), 9, III
<b>Excepted Quantity</b>	E1
<b>Limited quantity</b>	5 L

### IMDG/IMO

<b>UN/ID No</b>	UN3082
<b>Proper shipping name</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>Marine pollutant</b>	Yes
<b>EmS No.</b>	F-A, S-F
<b>Description</b>	UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (FUEL OIL, RESIDUAL), 9, III, MARINE POLLUTANT
<b>Special Provisions</b>	274, 335, 969
<b>Excepted Quantity</b>	E1
<b>Limited quantity</b>	5 L

### ICAO/IATA

<b>UN/ID No</b>	UN3082
<b>Proper shipping name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>ERG Code</b>	9L
<b>Special Provisions</b>	A97, A158, A197
<b>Description</b>	UN3082, Environmentally hazardous substance, liquid, n.o.s. (Fuel oil, residual), 9, III
<b>Excepted Quantity</b>	E1
<b>Limited quantity</b>	30 kg G

### ADN

<b>UN/ID No</b>	UN3082
<b>Proper shipping name</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
<b>Hazard class</b>	9
<b>Hazard Labels</b>	9
<b>Packing Group</b>	III
<b>Environmental hazard</b>	Yes
<b>Classification Code</b>	M6
<b>Special Provisions</b>	274, 335, 375, 601
<b>Description</b>	UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual), 9, III
<b>Excepted Quantity</b>	E1
<b>Limited quantity</b>	5 L
<b>Equipment Requirements</b>	PP



SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

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

European Union

#### REACH

This substance has been registered according to Regulation (EU) No. 1907/2006 (REACH).

International Inventories      The substance is listed or exempted from listing in the following inventories:

- Australia (AICS)
- Canada (DSL/NDSL)
- China (IECSC)
- Europe (EINECS/ELINCS/NLP)
- New Zealand (NZIoC)
- Taiwan (TCSI)
- U.S.A. (TSCA)

Further information

No information available

### 15.2. Chemical Safety Assessment

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

### Section 16: OTHER INFORMATION

#### Full text of H-Statements referred to under sections 2 and 3

H350 - May cause cancer

H361d - Suspected of damaging the unborn child

H332 - Harmful if inhaled

H373 - May cause damage to organs through prolonged or repeated exposure

H400 - Very toxic to aquatic life

H410 - Very toxic to aquatic life with long lasting effects

#### Abbreviations, acronyms

ACGIH = American Conference of Governmental Industrial Hygienists

bw = body weight

bw/day = body weight/day

EC x = Effect Concentration associated with x% response

GLP = Good Laboratory Practice

IARC = International Agency for Research of Cancer

LC50 = 50% Lethal concentration - Concentration of a chemical in air or a chemical in water which causes the death of 50% (one half) of a group of test animals

LD50 = 50% Lethal Dose - Chemical amount, given at once, which causes the death of 50% (one half) of a group of test animals

LL = Lethal Loading

NIOSH = National Institute of Occupational Safety and Health

NOAEL = No Observed Adverse Effect Level

NOEC = No Observed Effect Concentration





SDS # : A13373

## LOW SULFUR FUEL OIL (UN 3082)

Revision Date: 2020-07-10

Version 2

NOEL = No Observed Effect Level  
 OECD = Organization for Economic Co-operation and Development  
 OSHA = Occupational Safety and Health Administration  
 UVCB = Substance of unknown or Variable composition, Complex reaction products or Biological material  
 ATE = Acute Toxicity Estimate  
 QSAR = Quantitative Structure-Activity Relationship  
 EL50 = median Effective Loading  
 NOELR = No Observed Effect Loading Rate  
 PAH = Polycyclic aromatic hydrocarbons  
 LOEC = Lowest Observed Effect Concentration  
 PVA = Polyvinyl alcohol  
 PVC = Polyvinyl chloride  
 ECOSAR = Ecological Structure Activity Relationships  
 CNS = Central nervous system  
 EPA = Environmental Protection Agency  
 ErL50 = effective loading on growth rate in algae test, to cause a 50% response  
 EbL50 = effective loading on growth with the control in algae test, to cause a 50% response  
 DNEL = Derived No Effect Level  
 PNEC = Predicted No Effect Concentration  
 dw = dry weight  
 fw = fresh water  
 mw = marine water  
 or = occasional release

### Legend Section 8

OEL = Occupational Exposure Limit  
 TWA: Time Weight Average  
 STEL: Short Time Exposure Limit  
 PEL: Permissible exposure limit  
 REL: Recommended exposure limit  
 TLV: Threshold Limit Values

+	Sensitizer	*	Skin designation
**	Hazard Designation	C:	Carcinogen
M:	Mutagen	R:	Toxic to reproduction

**Revision Date:** 2020-07-10  
**Revision Note** Name change. (M)SDS sections updated: 1.

**This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006**

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfil his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of the Safety Data Sheet

**ES08001**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

### Manufacture of substances, Industrial.

**Use Descriptor**

**Sector of use**

SU3 - Industrial Manufacturing (all)

SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)

SU9 - Manufacture of fine chemicals

**Process category**

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC15 - Use as laboratory reagent

**Environmental Release Category**

ERC1 - Manufacture of substances

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

**Specific Environmental Release Category**

ESVOC SpERC 1.1.v1.

**Processes, tasks, activities covered**

Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

**Product characteristics**

Substance is complex UVCB. Predominantly hydrophobic.

**Amounts used**

:

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 1.1E+7

Fraction of Regional tonnage used locally: 5.2E-2

Annual site tonnage (tonnes/year): 6.0E+5

Maximum daily site tonnage (kg/day): 2.0E+6

**Frequency and duration of use** Continuous release

Emission Days (days/year): 300

**Environment factors not influenced by risk management**

-

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

**Other operational conditions of use affecting environmental exposure**

-.

Release fraction to air from process (initial release prior to RMM): 1.0E-4

Release fraction to wastewater from process (initial release prior to RMM): 3.0E-6

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

**Technical conditions and measures at process level to prevent release**

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

**Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Risk from environmental exposure is driven by humans via indirect exposure

Onsite wastewater treatment required

Prevent discharge of undissolved substance to or recover from onsite wastewater

Treat air emission to provide a typical removal efficiency of (%): 90

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  $\geq 85.9$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

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

:

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d):  $2.3E+6$

Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 10000

**Conditions and measures related to external treatment of waste for disposal**

During manufacturing no waste of the substance is generated.

**Conditions and measures related to external recovery of waste**

During manufacturing no waste of the substance is generated.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics**

**Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Amounts used**

Not applicable.

**Frequency and duration of use**

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

**Human factors not influenced by risk management**

not applicable

**Other operational conditions affecting exposure**

Operation is carried out at elevated temperature ( $> 20^{\circ}\text{C}$  above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

<b>2.2a. Control of worker exposure</b>	
<b>Contributing Scenarios</b>	<b>Operational conditions and risk management measures</b>
<b>General measures (carcinogens)</b>	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
<b>General exposures (closed systems)</b>	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Process sampling Outdoor</b>	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.
<b>Bulk product storage</b>	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Laboratory activities</b>	Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure. Wear suitable gloves tested to EN374.
<b>Marine vessel/barge (un)loading</b>	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.
<b>Road tanker/rail car loading</b>	Ensure material transfers are under containment or extract ventilation. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Equipment cleaning and maintenance</b>	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.

<b>2.2b. Control of consumer exposure</b>	
<b>Product Category(ies)</b>	<b>Operational conditions and risk management measures</b>
<b>Not applicable</b>	

### **3. Exposure estimation and references**

#### **Health**

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

#### **Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance for Downstream User to check compliance with the Exposure scenario

### Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

### Environment

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

**ES08002**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

**Use as an intermediate, Industrial.**

### Use Descriptor

#### Sector of use

SU3 - Industrial Manufacturing (all)

SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)

SU9 - Manufacture of fine chemicals

### Process category

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC15 - Use as laboratory reagent

### Environmental Release Category

ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

### Specific Environmental Release Category

ESVOC SpERC 6.1a.v1.

### Processes, tasks, activities covered

Use of substance as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

#### Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

#### Amounts used

:

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 1.3E+5

Fraction of Regional tonnage used locally: 1.2E-1

Annual site tonnage (tonnes/year): 1.5e+4

Maximum daily site tonnage (kg/day): 5.0E+4

#### Frequency and duration of use

 Continuous release

Emission Days (days/year): 300

#### Environment factors not influenced by risk management

-

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

#### Other operational conditions of use affecting environmental exposure

:-

Release fraction to air from process (initial release prior to RMM): 1.0E-5

Release fraction to wastewater from process (initial release prior to RMM): 1.0E-5

Release fraction to soil from process (initial release prior to RMM): 0.001

**Technical conditions and measures at process level to prevent release**

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

**Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Risk from environmental exposure is driven by freshwater sediment

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required

Prevent discharge of undissolved substance to or recover from onsite wastewater

Treat air emission to provide a typical removal efficiency of (%): 80

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  $\geq 54.0$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

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

:

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d):  $1.9E+5$

Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000

**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.

**Conditions and measures related to external recovery of waste**

This substance is consumed during use and no waste of the substance is generated.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics****Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Amounts used**

Not applicable.

**Frequency and duration of use**

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

**Human factors not influenced by risk management**

not applicable

**Other operational conditions affecting exposure**

Operation is carried out at elevated temperature ( $> 20^{\circ}\text{C}$  above ambient temperature). Assumes a good basic standard of occupational hygiene is implemented.

<b>2.2a. Control of worker exposure</b>	
<b>Contributing Scenarios</b>	<b>Operational conditions and risk management measures</b>
<b>General measures (carcinogens)</b>	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
<b>General exposures (closed systems)</b>	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>General exposures (closed systems) Process sampling Outdoor</b>	Handle substance within a closed system. 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.
<b>Bulk product storage</b>	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Laboratory activities</b>	Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure. Wear suitable gloves tested to EN374.
<b>Marine vessel/barge (un)loading</b>	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.
<b>Road tanker/rail car loading</b>	Avoid carrying out activities involving exposure for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Equipment cleaning and maintenance</b>	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.

<b>2.2b. Control of consumer exposure</b>	
<b>Product Category(ies)</b>	<b>Operational conditions and risk management measures</b>
<b>Not applicable</b>	

### **3. Exposure estimation and references**

#### **Health**

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

#### **Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.



## 4. Guidance for Downstream User to check compliance with the Exposure scenario

### Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

### Environment

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

**ES08003**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

### Industrial, Distribution of substance.

**Use Descriptor**

**Sector of use**

SU3 - Industrial Manufacturing (all)

**Process category**

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC15 - Use as laboratory reagent

**Environmental Release Category**

ERC1 - Manufacture of substances

ERC2 - Formulation of preparations

ERC3 - Formulation in materials

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

ERC5 - Industrial use resulting in inclusion into or onto a matrix

ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

ERC6b - Industrial use of reactive processing aids

ERC6c - Industrial use of monomers for manufacture of thermoplastics

ERC6d - Industrial use of process regulators for polymerization processes in production of resins, rubbers, polymers

ERC7 - Industrial use of substances in closed systems

**Specific Environmental Release Category**

ESVOC SpERC 1.1b. v1.

**Processes, tasks, activities covered**

Bulk loading (including marine vessel/barge, rail/road car and IBC loading) of substance within closed or contained systems, including incidental exposures during its sampling, storage, unloading, maintenance and associated laboratory activities.

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

**Product characteristics**

Substance is complex UVCB. Predominantly hydrophobic.

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 1.1E+7

Fraction of Regional tonnage used locally: 2.0E-3

Annual site tonnage (tonnes/year): 2.3E+4

Maximum daily site tonnage (kg/day): 7.7E+4

**Frequency and duration of use** Continuous release

Emission Days (days/year): 300

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

Release fraction to air from process (initial release prior to RMM): 1.0E-4

Release fraction to wastewater from process (initial release prior to RMM): 1.0E-7

Release fraction to soil from process (initial release prior to RMM): 0.00001

**Technical conditions and measures at process level to prevent release**

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

**Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Risk from environmental exposure is driven by humans via indirect exposure

No wastewater treatment required

Treat air emission to provide a typical removal efficiency of (%): 90

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  $\geq 0$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d):  $3.8E+5$

Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000

**Conditions and measures related to external treatment of waste for disposal**

External treatment and disposal of waste should comply with applicable local and/or national regulations.

**Conditions and measures related to external recovery of waste**

External recovery and recycling of waste should comply with applicable local and/or national regulations.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics****Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Frequency and duration of use**

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

**Other operational conditions affecting exposure**

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

## 2.2a. Control of worker exposure

Contributing Scenarios	Operational conditions and risk management measures
<b>General measures (carcinogens)</b>	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
<b>General exposures (closed systems)</b>	Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours. Sample via a closed loop or other system to avoid exposure. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Process sampling Outdoor</b>	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.
<b>Bulk product storage</b>	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Laboratory activities</b>	Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure. Wear suitable gloves tested to EN374.
<b>Marine vessel/barge (un)loading</b>	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.
<b>Road tanker/rail car loading</b>	Ensure material transfers are under containment or extract ventilation. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Equipment cleaning and maintenance</b>	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.
<b>Product sampling</b>	Sample via a closed loop or other system to avoid exposure. Avoid carrying out operation for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

## 2.2b. Control of consumer exposure

Product Category(ies)	Operational conditions and risk management measures
Not applicable	

## 3. Exposure estimation and references

**Health**

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

**Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance for Downstream User to check compliance with the Exposure scenario

**Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

**Environment**

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

**ES08004**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

### Formulation & (re)packing of substances and mixtures, Industrial.

**Use Descriptor**

**Sector of use**

SU3 - Industrial Manufacturing (all)

SU10 - Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

**Process category**

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC15 - Use as laboratory reagent

**Environmental Release Category**

ERC2 - Formulation of preparations

**Specific Environmental Release Category**

ESVOC SpERC 2.2.v1.

**Processes, tasks, activities covered**

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

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

**Product characteristics**

Substance is complex UVCB. Predominantly hydrophobic.

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 1.1E+7

Fraction of Regional tonnage used locally: 2.6E-3

Annual site tonnage (tonnes/year): 3.0E+4

Maximum daily site tonnage (kg/day): 1.0+5

**Frequency and duration of use** Continuous release

Emission Days (days/year): 300

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

Release fraction to air from process (initial release prior to RMM): 2.2E-3

Release fraction to wastewater from process (initial release prior to RMM): 5.0E-6

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

**Technical conditions and measures at process level to prevent release**

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

**Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Risk from environmental exposure is driven by humans via indirect exposure

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required

Prevent discharge of undissolved substance to or recover from onsite wastewater

Treat air emission to provide a typical removal efficiency of (%): 0

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): >=54

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d): 1.1E+5

Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000

**Conditions and measures related to external treatment of waste for disposal**

External treatment and disposal of waste should comply with applicable local and/or national regulations.

**Conditions and measures related to external recovery of waste**

External recovery and recycling of waste should comply with applicable local and/or national regulations.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics****Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Frequency and duration of use**

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

**Other operational conditions affecting exposure**

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

## 2.2a. Control of worker exposure

Contributing Scenarios	Operational conditions and risk management measures
<b>General measures (carcinogens)</b>	<p>Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>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.</p>
<b>General exposures (closed systems)</b>	<p>Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
<b>General exposures (closed systems) Process sampling</b>	<p>Handle substance within a closed system. 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.</p>
<b>Bulk product storage</b>	<p>Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
<b>Laboratory activities</b>	<p>Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure. Wear suitable gloves tested to EN374.</p>
<b>Marine vessel/barge (un)loading</b>	<p>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.</p>
<b>Road tanker/rail car loading</b>	<p>Ensure material transfers are under containment or extract ventilation. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
<b>Equipment cleaning and maintenance</b>	<p>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.</p>
<b>Product sampling</b>	<p>Sample via a closed loop or other system to avoid exposure. Avoid carrying out operation for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
<b>Drum/batch transfers</b>	<p>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.</p>



## 2.2b. Control of consumer exposure

Product Category(ies)	Operational conditions and risk management measures
Not applicable	

## 3. Exposure estimation and references

### Health

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

### Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance for Downstream User to check compliance with the Exposure scenario

### Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

### Environment

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

**ES08007**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

**Use as a fuel, Industrial.**

### Use Descriptor

#### Sector of use

SU3 - Industrial Manufacturing (all)

### Process category

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected

### Environmental Release Category

ERC7 - Industrial use of substances in closed systems

### Specific Environmental Release Category

ESVOC SpERC 7.12a.v1.

### Processes, tasks, activities covered

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

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

#### Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 1.1E+7

Fraction of Regional tonnage used locally: 1.4E-1

Annual site tonnage (tonnes/year): 1.5E+6

Maximum daily site tonnage (kg/day): 5.0E+6

#### Frequency and duration of use

Continuous release  
Emission Days (days/year): 300

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

Release fraction to air from process (initial release prior to RMM): 7.0E-4

Release fraction to wastewater from process (initial release prior to RMM): 4.4E-7

Release fraction to soil from process (initial release prior to RMM): 0

#### Technical conditions and measures at process level to prevent release

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

#### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk from environmental exposure is driven by freshwater sediment

Onsite wastewater treatment required

Prevent discharge of undissolved substance to or recover from onsite wastewater

Treat air emission to provide a typical removal efficiency of (%): 95

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  $\geq 87.7$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d): 5.2E+6

Assumed domestic sewage treatment plant flow (m3/d): 2000

**Conditions and measures related to external treatment of waste for disposal**

Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

**Conditions and measures related to external recovery of waste**

This substance is consumed during use and no waste of the substance is generated.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics****Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Frequency and duration of use**

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

**Other operational conditions affecting exposure**

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

## 2.2a. Control of worker exposure

Contributing Scenarios	Operational conditions and risk management measures
<b>General measures (carcinogens)</b>	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
<b>General exposures (closed systems)</b>	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out operation for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>General exposures (closed systems) Product sampling</b>	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out operation for more than 1 hour. 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.
<b>Bulk closed unloading Outdoor</b>	Transfer via enclosed lines. Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Operation of solids filtering equipment</b>	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.
<b>Drum/batch transfers</b>	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.
<b>Use as a fuel (closed systems)</b>	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Equipment cleaning and maintenance</b>	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.
<b>Bulk product storage</b>	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.

## 2.2b. Control of consumer exposure

Product Category(ies)	Operational conditions and risk management measures
<b>Not applicable</b>	

### 3. Exposure estimation and references

#### Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### 4. Guidance for Downstream User to check compliance with the Exposure scenario

#### Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

#### Environment

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

**ES08008**

**Version** 1.0

**Trade name / designation** Heavy Fuel Oil

## 1. Exposure scenario

### Use as a fuel, Professional.

**Use Descriptor**

**Sector of use**

SU22 - Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

**Process category**

PROC1 - Use in closed process, no likelihood of exposure

PROC2 - Use in closed, continuous process with occasional controlled exposure

PROC3 - Use in closed batch process (synthesis or formulation)

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

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

PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected

**Environmental Release Category**

ERC9a - Wide dispersive indoor use of substances in closed systems

ERC9b - Wide dispersive outdoor use of substances in closed systems

**Specific Environmental Release Category**

ESVOC SpERC 9.12b.v1.

**Processes, tasks, activities covered**

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

## 2. Operational conditions and risk management measures

### 2.1. Control of environmental exposure

**Product characteristics**

Substance is complex UVCB. Predominantly hydrophobic.

Fraction of EU tonnage used in region: 0.1

Regional use tonnage (tonnes/year): 3.3E+5

Fraction of Regional tonnage used locally: 5.0E-4

Annual site tonnage (tonnes/year): 1.7E+2

Maximum daily site tonnage (kg/day): 4.6E+2

**Frequency and duration of use** Continuous release

Emission Days (days/year): 365

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

Release fraction to air from process (initial release prior to RMM): 1.0E-4

Release fraction to wastewater from process (initial release prior to RMM): 0.00001

Release fraction to soil from process (initial release prior to RMM): 0.00001

**Technical conditions and measures at process level to prevent release**

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

**Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Risk from environmental exposure is driven by humans via indirect exposure

No wastewater treatment required

Treat air emission to provide a typical removal efficiency of (%): N/A

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):  $\geq 0$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):  $\geq 0$

**Organizational measures to prevent/limit release from the site**

Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Estimated substance removal from wastewater via domestic sewage treatment (%): 88.8

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (MSafe) (kg/d): 2.3E+3

Assumed domestic sewage treatment plant flow (m3/d): 2000

**Conditions and measures related to external treatment of waste for disposal**

Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.

**Conditions and measures related to external recovery of waste**

This substance is consumed during use and no waste of the substance is generated.

**Remarks**

Additional information on the basis for the allocation of the identified OCs (operating conditions) and RMMs (Risk Management Measures) is contained in Petrorisk file

## 2.2. Control of exposure - Workers / Consumers

**Product characteristics****Physical State**

Liquid, vapor pressure < 0.5 kPa at STP

**Concentration of substance in product**

Covers percentage substance in the product up to 100 % (unless stated differently).

**Frequency and duration of use**

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

**Other operational conditions affecting exposure**

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

## 2.2a. Control of worker exposure

Contributing Scenarios	Operational conditions and risk management measures
<b>General measures (carcinogens)</b>	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
<b>General exposures (closed systems)</b>	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 1 hour. 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.
<b>General exposures (closed systems) Product sampling</b>	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 1 hour. Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
<b>Bulk closed unloading</b>	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.
<b>Refueling</b>	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.
<b>Drum/batch transfers</b>	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.
<b>Use as a fuel (closed systems)</b>	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
<b>Equipment cleaning and maintenance</b>	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 and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.

## 2.2b. Control of consumer exposure

Product Category(ies)	Operational conditions and risk management measures
<b>Not applicable</b>	

## 3. Exposure estimation and references



**Health**

The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

**Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## 4. Guidance for Downstream User to check compliance with the Exposure scenario

**Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterization.

**Environment**

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