

Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Material Name : Fuel oil, residual CAS 68476-33-5
Product Code : 002C0139
Other Identifier : Shell Fuelolie 77 0,5% S
REACH Registration No. : 01-2119474894-22-0045

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

Product Use : Fuel for use in off-road diesel engines, boilers, furnaces and other combustion equipment. Please refer to Ch16 for the registered uses under REACH.

Uses Advised Against : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier : Dansk Fuels A/S
Rued Langgaards Vej 6-8
DK-2300 Copenhagen S
Telephone : (+45) 3337 2000
Telefax : (+45) 3337 2900

1.4 Emergency telephone number : (+45) 3337 2000
Poison Center : (+45) 8212 1212
(Gifflinien, Bispebjerg Hospital)

1.5 Other Information

: PR.nr.
1806787

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008 (CLP)	
Hazard classes / Hazard categories	Hazard Statement
Carcinogenicity, Category 1B	H350

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Acute toxicity, Category 4; Inhalation	H332
Toxic to reproduction, Category 2	H361d
Specific target organ toxicity - repeated exposure, Category 2; Blood.; Liver.; Thymus.	H373
Acute hazards to the aquatic environment, Category 1	H400
Chronic hazards to the aquatic environment, Category 1	H410
	EUH066

67/548/EEC or 1999/45/EC	
Hazard Characteristics	R-phrases(s)
Carcinogenic, category 2.; Toxic to Reproduction, category 3.; Harmful.; Dangerous for the environment.	R20; R45; R48/21; R63; R66; R50/53

2.2 Label Elements

Labeling according to Regulation (EC) No 1272/2008

Symbol(s)

:



Signal Words

: Danger

CLP Hazard Statements

: HEALTH HAZARDS:
 H350: May cause cancer.
 H332: Harmful if inhaled.
 H361d: Suspected of damaging the unborn child.
 H373: May cause damage to organs or organ systems through prolonged or repeated exposure.
 Blood.
 Liver.
 Thymus.

EUH066: Repeated exposure may cause skin dryness or cracking.

ENVIRONMENTAL HAZARDS:

H410: Very toxic to aquatic life with long lasting effects.
 H400: Very toxic to aquatic life.

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CLP Precautionary statements

- Prevention** : P201: Obtain special instructions before use.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P281: Use personal protective equipment as required.
- Response** : P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331: Do NOT induce vomiting.
- Disposal** : P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

Labeling according to Directive 1999/45/EC/67/548/EEC

- EC Symbols : T Toxic.
N Dangerous for the environment.



- EC Classification : Carcinogenic, category 2. Toxic to Reproduction, category 3. Harmful. Dangerous for the environment.
- EC Risk Phrases : R20 Harmful by inhalation.
R45 May cause cancer.
R48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
R63 Possible risk of harm to the unborn child.
R66 Repeated exposure may cause skin dryness or cracking.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- EC Safety Phrases : S23 Do not breathe gas/fumes/vapour/spray.
S24 Avoid contact with skin.
S36/37 Wear suitable protective clothing and gloves.
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S51 Use only in well-ventilated areas.
S53 Avoid exposure. Obtain special instructions before use.
S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

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2.3 Other Hazards

- Health Hazards** : Hydrogen sulphide is highly toxic and may be fatal if inhaled. Hydrogen sulphide (H₂S), an extremely flammable and toxic gas, and other hazardous vapours may evolve and collect in the headspace of storage tanks, transport vessels and other enclosed containers.
May dull the sense of smell and has a high odour threshold, so do not rely on odour as an indication of hazard.
Contact with hot material can cause thermal burns which may result in permanent skin damage.
- Safety Hazards** : Not classified as flammable but will burn. Flammable vapours may be present even at temperatures below the flash point. Therefore it should be treated as a potentially flammable liquid. May ignite on surfaces at temperatures above auto-ignition temperature. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.
- Other Information** : This product is intended for use in closed systems only.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

- Synonyms** : Shell Fuel Olie 77 0,5% S
CAS No. : 68476-33-5

3.2 Mixtures

- Mixture Description** : Streams obtained from distillation and cracking processes and containing a mixture of saturated, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C₉ to C₅₀ range. Contains cracked components in which polycyclic aromatic compounds, mainly 3-ring but some 4 to 6 ring species, are present. Contains sulphur, oxygen, nitrogen compounds, vanadium and other metals at >10 ppm <500ppm w/w.
Product is not a mixture according to regulation 1907/2006/EC.

Hazardous Components

Classification of components according to Regulation (EC) No 1272/2008

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Chemical Name	CAS No.	EINECS	REACH Registration No.	Conc.
Fuel oil, residual	68476-33-5	270-675-6	01-2119474894-22	<= 100,00%

Chemical Name	Hazard Class & Category	Hazard Statement
Fuel oil, residual	Carc., 1B; Acute Tox., 4; Repr., 2; STOT RE, 2; Aquatic Chronic, 1; Aquatic Acute, 1;	H350; H332; H361d; H373; H410; H400; EUH066;

Classification of components according to 67/548/EEC

Chemical Name	CAS No.	EINECS	REACH Registration No.	Symbol(s)	R-phrase(s)	Conc.
Fuel oil, residual	68476-33-5	270-675-6	01-2119474894-22	T, Xn, N	R45; R48/21; R20; R63; R66; R50/53	<= 100,00%

Additional Information : Contains hydrogen sulphide, CAS # 7783-06-4.

Hydrogen sulphide may be present both in the liquid and the vapour. Composition is complex and varies with the source of the crude oil. Residues and their blends with distillates can be used as heavy fuel oils and need to be heated for use.

Refer to chapter 16 for full text of EC R-phrases.

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

- General Information** : Vaporisation of H₂S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from the victim to rescuer. Mechanical ventilation should be used to resuscitate if at all possible.
- Inhalation** : Remove to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
- Skin Contact** : Cold product - Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

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- Hot product - If contact with hot product, cool the burn area by flushing with large amounts of water. Do not attempt to remove anything from the burn area or apply burn creams or ointments. Cover the burn area loosely with a sterile dressing, if available. Transport to the nearest medical facility for additional treatment.
- Eye Contact** : Cold product - Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Hot product - If contact with hot product, cool the burn area by flushing with large amounts of water. Do not attempt to remove anything from the burn area or apply burn creams or ointments. Cover the burn area loosely with a sterile dressing, if available. Transport to the nearest medical facility for additional treatment.
- Ingestion** : If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Give nothing by mouth.
- 4.2 Most important symptoms and effects, both acute and delayed** : H2S has a broad range of effects dependent on the airborne concentration and length of exposure: 0.02 ppm odour threshold, smell of rotten eggs; 10 ppm eye and respiratory tract irritation; 100 ppm coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes; 200 ppm potential for pulmonary oedema after >20-30 minutes; 500 ppm loss of consciousness after short exposures, potential for respiratory arrest; >1000ppm immediate loss of consciousness, may lead rapidly to death, prompt cardiopulmonary resuscitation may be required. Do not depend on sense of smell for warning. H2S causes rapid olfactory fatigue (deadens sense of smell). There is no evidence that H2S will accumulate in the body tissue after repeated exposure. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
- 4.3 Indication of any immediate medical attention and special treatment needed** : Hydrogen sulphide (H2S) - CNS asphyxiant. May cause rhinitis, bronchitis and occasionally pulmonary oedema after severe exposure. CONSIDER: Oxygen therapy. Consult a Poison Control Center for guidance.
Exposure to hydrogen sulphide at concentrations above the recommended occupational exposure standard may cause headache, dizziness, irritation of the eyes, upper respiratory tract, mouth and digestive tract, convulsions, respiratory paralysis, unconsciousness and even death.
Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

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Clear fire area of all non-emergency personnel.

- 5.1 Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
- 5.2 Special hazards arising from the substance or mixture** : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Oxides of nitrogen. Oxides of sulphur. Unidentified organic and inorganic compounds. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Sinks in fresh water, floats on sea water and may reignite on water surface. Hydrogen sulphide (H₂S) and toxic sulphur oxides may be given off when this material is heated. Do not depend on sense of smell for warning.
- 5.3 Advice for firefighters** : Wear full protective clothing and self-contained breathing apparatus.
- Additional Advice** : Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Remove contaminated clothing. Evacuate the area of all non-essential personnel. Avoid contact with skin, eyes and clothing. Ventilate contaminated area thoroughly.

- 6.1 Personal Precautions, Protective Equipment and Emergency Procedures** : May ignite on surfaces at temperatures above auto-ignition temperature. Do not breathe fumes, vapour. Do not operate electrical equipment.
- 6.2 Environmental Precautions** : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure

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6.3 Methods and Material for Containment and Cleaning up

electrical continuity by bonding and grounding (earthing) all equipment.

: For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.

Additional Advice

: Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

6.4 Reference to other sections

: For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions

: Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.

Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin.

7.1 Precautions for Safe Handling

: The inherent toxic and olfactory (sense of smell) fatiguing properties of hydrogen sulphide require that air monitoring alarms be used if concentrations are expected to reach harmful levels such as in enclosed spaces, heated transport vessels

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- and spill or leak situations. If the air concentration exceeds 50 ppm, the area should be evacuated unless respiratory protection is in use. Avoid prolonged or repeated contact with skin. When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Earth all equipment.
- 7.2 Conditions for safe storage, including any incompatibilities** : Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Prevent ingress of water. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Tanks should be fitted with heating coils. Ensure heating coils are always covered with product (minimum 15 cm).
- 7.3 Specific end use(s)** : Please refer to Ch16 and/or the annexes for the registered uses under REACH.
- Additional Information** : Ensure that all local regulations regarding handling and storage facilities are followed.
Fire hazard classification: III-1
- Product Transfer** : Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.
- Recommended Materials** : For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE) and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.
- Unsuitable Materials** : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene. However, some may be suitable for glove materials.
- Container Advice** : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.

8.1 Control Parameters

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Hydrogen Sulphide	MAK (DA)	GV	10 ppm	15 mg/m3	
	ACGIH	TWA	1 ppm		
	ACGIH	STEL	5 ppm		

Additional Information : This substance has the remark K (Kræftfremkaldende = Carcinogenic) on the Danish Labour Inspection OEL list (Grænseværdilisten). This substance is regarded as carcinogenic in Denmark.

Material	Source	Hazard Designation
Fuel oil, residual	MAK (DA)	Carcinogenic.

Biological Exposure Index (BEI)

No biological limit allocated.

Derived No Effect Levels (DNEL/DMEL) Table

Component	Exposure Route	Exposure Type (long/short)	Application Area	Value

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Fuel oil, residual	Inhalation	acute, systemic effects	Worker	4700 mg/m ³ /15 mins (aerosol)
	Dermal	long term, systemic effects	Worker	0,065 mg/kg 8h
	Inhalation	long term, systemic effects	Worker	0,12 mg/m ³ /8h (aerosol)
	Oral	long term, systemic effects	Consumer	0,015 mg/kg 24h

PNEC related information : Substance is a hydrocarbon with a complex, unknown or variable composition. Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances.

8.2 Exposure Controls

General Information : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Occupational Exposure Controls

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

Eye Protection : Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166.

Hand Protection : Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove

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- suppliers. Contaminated gloves should be replaced. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When handling heated product wear heat resistant gloves. When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable.
- Body protection** : Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
- Respiratory Protection** : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations.
Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387.
- Thermal Hazards** : When handling heated product, wear heat resistant gloves, safety hat with visor, and heat resistant coveralls (with cuffs over gloves and legs over boots), and heavy-duty boots, e.g. leather for heat resistance.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
- Environmental Exposure Controls**
- Environmental exposure control measures** : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
- Consumer Exposure Controls**
- Exposure Control Measures for Consumers** : If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	: Brown to black. Viscous liquid.
Odour	: Hydrocarbon.
pH	: Not applicable
Initial Boiling Point and Boiling Range	: 150 - 750 °C / 302 - 1.382 °F
Melting / freezing point	: < 30 °C / 86 °F
Flash point	: > 68 °C / 154 °F (ASTM D-93 / PMCC)
Upper / lower Flammability or Explosion limits	: Typical 0,50 - 5,00 %(V)
Auto-ignition temperature	: > 220 °C / 428 °F
Vapour pressure	: 0,2 - 7,91 hPa at 120 °C / 248 °F
Specific gravity	: Data not available
Density	: 0,84 - 1,2 g/cm ³ at 15,00 °C / 59,00 °F
Bulk density	: Data not available
Water solubility	: Negligible.
Solubility in other solvents	: Data not available
n-octanol/water partition coefficient (log Pow)	: Data not available
Dynamic viscosity	: Data not available
Kinematic viscosity	: < 80 mm ² /s at 80 °C / 176 °F
Vapour density (air=1)	: Data not available
Evaporation rate (nBuAc=1)	: Data not available
Decomposition Temperature	: Data not available

9.2 Other Information

Other Information	: Not applicable.
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10. STABILITY AND REACTIVITY

10.1 Reactivity	: Oxidises on contact with air.
10.2 Chemical stability	: Stable under normal conditions of use.
10.3 Possibility of Hazardous Reactions	:
10.4 Conditions to Avoid	: Oxidises on contact with air.
10.5 Incompatible	: Avoid heat, sparks, open flames and other ignition sources.
	: Strong oxidising agents.

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10.6 Hazardous Decomposition Products : Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological effects

Basis for Assessment : Information given is based on product data, a knowledge of the components and the toxicology of similar products.

Likely Routes of Exposure : Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.

Acute Oral Toxicity : Low toxicity: LD50 > 5000 mg/kg , Rat

Acute Dermal Toxicity : Low toxicity: LD50 >2000 mg/kg , Rabbit

Acute Inhalation Toxicity : Harmful if inhaled. LC50 > 1.0 - <= 5.0 mg/l / 4 h, Rat

Skin Corrosion/Irritation : Expected to be slightly irritating. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis. Contact with hot material can cause thermal burns which may result in permanent skin damage.

Serious Eye Damage/Irritation : Expected to be slightly irritating. Hot product may cause severe eye burns and/or blindness.

Respiratory Irritation : Inhalation of vapours or mists may cause irritation to the respiratory system.

Respiratory or Skin Sensitisation : Not expected to be a sensitiser.

Aspiration Hazard : Not considered an aspiration hazard.

Germ Cell Mutagenicity : Positive in in-vitro, but negative in in-vivo mutagenicity assays.

Carcinogenicity : Causes cancer in laboratory animals.

Reproductive and Developmental Toxicity : Causes foetotoxicity at doses which are maternally toxic.

Specific target organ toxicity - single exposure : Not expected to be a hazard.

Specific target organ toxicity - repeated exposure : May cause damage to organs or organ systems through prolonged or repeated exposure. Blood. Liver. Thymus.

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12. ECOLOGICAL INFORMATION

- Basis for Assessment** : Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products.
- 12.1 Toxicity**
- Acute Toxicity** : Expected to be very toxic: LL/EL/IL50 < 1 mg/l (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.)
- Fish** : Harmful: LL/EL/IL50 10-100 mg/l
- Aquatic Invertebrates** : Toxic: LL/EL/IL50 1-10 mg/l
- Algae** : Very toxic: LL/EL/IL50 < 1 mg/l
- Microorganisms** : Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l
- Chronic Toxicity**
- Fish** : NOEC/NOEL expected to be > 0.01 - <= 0.1 mg/l (based on modeled data)
- Aquatic Invertebrates** : NOEC/NOEL expected to be > 0.1 - <= 1.0 mg/l (based on modeled data)
- 12.2 Persistence and degradability** : The volatile constituents will oxidize rapidly by photochemical reactions in air. Major constituents are inherently biodegradable.
- 12.3 Bioaccumulative Potential** : Contains constituents with the potential to bioaccumulate.
- 12.4 Mobility** : Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. Large volumes may penetrate soil and could contaminate groundwater. Sinks in fresh water, but will float on sea water and form a slick. Contains volatile constituents.
- 12.5 Result of PBT and vPvB assesment** : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.
- 12.6 Other Adverse Effects** : Films formed on water may affect oxygen transfer and damage organisms.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Container Disposal** : Send to drum recoverer or metal reclaimer. Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard if heated above the flash point. Do not puncture, cut or weld uncleaned drums. Do not pollute the soil, water or environment with the waste container. Comply with any local recovery or waste disposal regulations.
- Local Legislation** : EU Waste Disposal Code (EWC): 13 07 01 fuel oil and diesel. The number given to waste is associated with the appropriate usage. The user must decide if their particular use results in another waste code being assigned. Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with. By dispose to Kommunekemi state the chemical waste group. C.

14. TRANSPORT INFORMATION

Land transport (ADR/RID):

ADR

- 14.1 UN number : 3082
- 14.2 UN proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual, Heavy fuel oil)
- 14.3 Transport hazard class(es) : 9

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14.4 Packing group : III
Danger label (primary risk) : 9
14.5 Environmental hazards : Environmentally Hazardous
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

RID

14.1 UN number : 3082
14.2 UN proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual, Heavy fuel oil)
14.3 Transport hazard class(es) : 9
14.4 Packing group : III
Danger label (primary risk) : 9
14.5 Environmental hazards : Environmentally Hazardous
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Sea transport (IMDG Code):

14.1 UN number : UN 3082
14.2 UN proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical name : (Fuel oil, residual, Heavy fuel oil)
14.3 Transport hazard class(es) : 9
14.4 Packing group : III
14.5 Marine pollutant : Yes
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Air transport (IATA):

14.1 UN number : 3082
14.2 UN proper shipping name : Environmentally hazardous substance, liquid, n.o.s.
Technical name : (Fuel oil, residual, Heavy fuel oil)
14.3 Transport hazard : 9

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class(es)

14.4 Packing group : III

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

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution Category : Not applicable.

Ship Type : Not applicable.

Product Name : Not applicable.

Special Precaution : Not applicable.

Additional Information : MARPOL Annex 1 rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

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

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

Other regulatory Information

Other Information : Contains component(s) which are restricted for use with young people. Contains component(s) which may potentially endanger the health of pregnant woman and the unborn child.

15.2 Chemical Safety Assessment : A Chemical Safety Assessment was performed for this substance.

16. OTHER INFORMATION

R-phrases

R20 Harmful by inhalation.

R45 May cause cancer.

R48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin.

R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R63 Possible risk of harm to the unborn child.

R66 Repeated exposure may cause skin dryness or cracking.

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CLP Hazard Statements

H332	Harmful if inhaled.
H350	May cause cancer.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs or organ systems through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Identified Uses according to the Use Descriptor System

Uses - Worker

Title : Manufacture of substance
- Industrial

Uses - Worker

Title : Use as an intermediate
- Industrial

Uses - Worker

Title : Distribution of substance
- Industrial

Uses - Worker

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

Uses - Worker

Title : Use as a fuel
- Industrial

Uses - Worker

Title : Use as a fuel
- Professional

Recommended Restrictions on Use (Advice Against)

: This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

Additional Information

: This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.

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Other Information

- Further Information** : This product is intended for use in closed systems only.
- MSDS Distribution** : The information in this document should be made available to all who may handle the product.
- MSDS Version Number** : 1.3
- MSDS Effective Date** : 09.02.2012
- MSDS Revisions** : A vertical bar (|) in the left margin indicates an amendment from the previous version.
- MSDS Regulation** : Regulation 1907/2006/EC
- Disclaimer** : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Safety Data Sheet

Exposure Scenario - Worker

Fuel oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Manufacture of substance - Industrial
Use Descriptor	Sector of Use: SU 3, SU8, SU9 Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 15 Environmental Release Categories: ERC 1, ERC 4, ESVOC SpERC 1.1.v1
Scope of process	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).

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance.

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	<p>Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures.</p> <p>Consider the need for risk based health surveillance.</p>
General exposures (closed systems).	<p>Handle substance within a closed system.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Process sampling.Outdoor.	<p>Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 15 minutes.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Laboratory activities.	<p>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.</p> <p>Wear suitable gloves tested to EN374.</p>
Marine vessel/barge (un)loading.	<p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Transfer via enclosed lines.</p> <p>Clear transfer lines prior to de-coupling.</p> <p>Retain drain downs in sealed storage pending disposal or for subsequent recycle.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Road tanker/rail car loading.	<p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Equipment cleaning and	<p>Drain down and flush system prior to equipment break-in or</p>

Safety Data Sheet

maintenance.	maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage.	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.

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,1E+07
Fraction of Regional tonnage used locally:	5,2E-02
Annual site tonnage (tonnes/year):	6,0E+05
Maximum daily site tonnage (kg/day):	2,0E+06
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-06
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary	

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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 >= (%)	85,9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0,0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,3E+06
Assumed domestic sewage treatment plant flow (m3/d)	10.000
Conditions and Measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated.	

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

Section 3.2 - Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.	

Safety Data Sheet

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.
 Risk Management Measures are based on qualitative risk characterisation.

Section 4.2 -Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

Safety Data Sheet

Exposure Scenario - Worker

Fuel Oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Use as an intermediate - Industrial
Use Descriptor	Sector of Use: SU 3, SU8, SU9 Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 15 Environmental Release Categories: ERC 6A, ESVOC SpERC 6.1a.v1
Scope of process	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).

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where

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	<p>possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.</p>
General exposures (closed systems).	<p>Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
General exposures (closed systems). Process sampling. Outdoor.	<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>
Laboratory activities.	<p>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374.</p>
Marine vessel/barge (un)loading.	<p>Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Avoid carrying out activities involving exposure for more than 4 hours. 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>
Road tanker/rail car loading.	<p>Ensure material transfers are under containment or extract ventilation. , or: 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>

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Equipment cleaning and maintenance.	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage.	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.

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,3E+05
Fraction of Regional tonnage used locally:	1,2E-01
Annual site tonnage (tonnes/year):	1,5E+04
Maximum daily site tonnage (kg/day):	5,0E+04
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-05
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-03
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide	54,0

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the required removal efficiency of \geq (%)	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,9E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of substance is generated.	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of substance is generated.	

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

Section 3.2 - Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users	

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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.
Risk Management Measures are based on qualitative risk characterisation.

Section 4.2 -Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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Exposure Scenario - Worker

Fuel Oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Distribution of substance - Industrial
Use Descriptor	<p>Sector of Use: SU 3</p> <p>Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 15</p> <p>Environmental Release Categories: ERC 1, ERC 2, ERC 3, ERC 4, ERC 5, ERC 6A, ERC 6B, ERC 6C, ERC 6D, ERC 7, ESVOC SpERC 1.1b.v1</p>
Scope of process	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.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance.

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	<p>Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures.</p> <p>Consider the need for risk based health surveillance.</p>
General exposures (closed systems).	<p>Handle substance within a closed system.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Sample via a closed loop or other system to avoid exposure.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Process sampling.Outdoor.	<p>Sample via a closed loop or other system to avoid exposure.</p> <p>Avoid carrying out activities involving exposure for more than 15 minutes.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Laboratory activities.	<p>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.</p> <p>Wear suitable gloves tested to EN374.</p>
Marine vessel/barge (un)loading.	<p>Transfer via enclosed lines.</p> <p>Clear transfer lines prior to de-coupling.</p> <p>Retain drain downs in sealed storage pending disposal or for subsequent recycle.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Road tanker/rail car loading.	<p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Wear chemically resistant gloves (tested to EN374) in</p>

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	combination with 'basic' employee training.
Equipment cleaning and maintenance.	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.
Bulk product storage.	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.
Product sampling.	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.

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,1E+07
Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	2,3E+04
Maximum daily site tonnage (kg/day):	7,7E+04
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-07
Release fraction to soil from process (initial release prior to RMM):	1,0E-05
Technical conditions and measures at process level (source) to prevent release	

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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 (primarily ingestion).	
No 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 >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3,8E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

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

Section 3.2 - Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
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Section 4.1 - Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. 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. Risk Management Measures are based on qualitative risk characterisation.

Section 4.2 -Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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Exposure Scenario - Worker

Fuel Oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Formulation & (re)packing of substances and mixtures - Industrial
Use Descriptor	Sector of Use: SU 3, SU 10 Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 15 Environmental Release Categories: ERC 2, ESVOC SpERC 2.2.v1
Scope of process	Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance.

Safety Data Sheet

	<p>Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures.</p> <p>Consider the need for risk based health surveillance.</p>
General exposures (closed systems).Process sampling.	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure.</p> <p>Avoid carrying out activities involving exposure for more than 15 minutes.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
General exposures (closed systems).	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Laboratory activities.	<p>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.</p> <p>Wear suitable gloves tested to EN374.</p>
Marine vessel/barge (un)loading.	<p>Transfer via enclosed lines.</p> <p>Clear transfer lines prior to de-coupling.</p> <p>Retain drain downs in sealed storage pending disposal or for subsequent recycle.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Road tanker/rail car loading.	<p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p>

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	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Drum/batch transfers.	Ensure material transfers are under containment or extract ventilation. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Equipment cleaning and maintenance.	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage.	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.
Product sampling.	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.

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,1E+07
Fraction of Regional tonnage used locally:	2,6E-03
Annual site tonnage (tonnes/year):	3,0E+04
Maximum daily site tonnage (kg/day):	1,0E+05
Frequency and Duration of Use	

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Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	2,2E-03
Release fraction to wastewater from process (initial release prior to RMM):	5,0E-06
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).	
If discharging to domestic sewage treatment plant, no secondary 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 >= (%)	54,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,1E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	

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

SECTION 3**EXPOSURE ESTIMATION****Section 3.1 - Health**

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

Section 3.2 - Environment

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

SECTION 4**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. 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. Risk Management Measures are based on qualitative risk characterisation.

Section 4.2 - Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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Exposure Scenario - Worker

Fuel Oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Use as a fuel - Industrial
Use Descriptor	Sector of Use: SU 3 Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 Environmental Release Categories: ERC 7, ESVOC SpERC 7.12a.v1
Scope of process	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to

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	<p>operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures.</p> <p>Consider the need for risk based health surveillance.</p>
General exposures (closed systems).	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
General exposures (closed systems).Product sampling.	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure.</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Provide a good standard of controlled ventilation (10 to 15 air changes per hour).</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Bulk closed unloading.Outdoor.	<p>Transfer via enclosed lines.</p> <p>Avoid carrying out activities involving exposure for more than 4 hours.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Drum/batch transfers.	<p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p> <p>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
Operation of solids filtering equipment.	<p>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</p>

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	Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Use as a fuel(closed systems).	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Equipment cleaning and maintenance.	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage.	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.

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,1E+07
Fraction of Regional tonnage used locally:	1,4E-01
Annual site tonnage (tonnes/year):	1,5E+06
Maximum daily site tonnage (kg/day):	5,0E+06
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	7,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	4,4E-07
Release fraction to soil from process (initial release prior to RMM):	0

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Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
If discharging to domestic sewage treatment plant, no secondary 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 >= (%)	87,7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5,2E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. Waste 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 substance is generated.	

SECTION 3	EXPOSURE ESTIMATION
Section 3.1 - Health	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

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SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p> <p>Available hazard data do not enable the derivation of a DNEL for carcinogenic effects.</p> <p>Risk Management Measures are based on qualitative risk characterisation.</p>	
Section 4.2 -Environment	
<p>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.</p>	
<p>Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.</p>	
<p>Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.</p>	
<p>Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org).</p>	

Safety Data Sheet

Exposure Scenario - Worker

Fuel Oil	
SECTION 1	EXPOSURE SCENARIO TITLE
Title	Use as a fuel - Professional
Use Descriptor	Sector of Use: SU 22 Process Categories: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 Environmental Release Categories: ERC 9A, ERC 9B, ESVOC SpERC 9.12b.v1
Scope of process	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
Frequency and Duration of Use	
Covers daily exposures up to 8 hours (unless stated differently).	
Other Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to

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	<p>operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely.</p> <p>Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures.</p> <p>Consider the need for risk based health surveillance.</p>
General exposures (closed systems).	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Provide a good standard of controlled ventilation (10 to 15 air changes per hour).</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p>
General exposures (closed systems).Product sampling.	<p>Handle substance within a closed system.</p> <p>Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 1 hour.</p> <p>Provide a good standard of controlled ventilation (10 to 15 air changes per hour).</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.</p>
Bulk closed unloading.	<p>Provide a good standard of controlled ventilation (10 to 15 air changes per hour).</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p> <p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p> <p>Avoid carrying out activities involving exposure for more than 1 hour.</p>
Drum/batch transfers.	<p>Provide a good standard of controlled ventilation (10 to 15 air changes per hour).</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</p> <p>Ensure material transfers are under containment or extract ventilation.</p> <p>, or:</p>

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

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	3,3E+05
Fraction of Regional tonnage used locally:	5,0E-04
Annual site tonnage (tonnes/year):	1,7E+02
Maximum daily site tonnage (kg/day):	4,6E+02
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from wide dispersive use (regional only):	1,0E-04
Release fraction to wastewater from wide dispersive use:	1,0E-05
Release fraction to soil from wide dispersive use (regional only):	1,0E-05

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Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).	
No wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Treat air emission to provide a typical removal efficiency of (%)	
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 (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,3E+03
Assumed domestic sewage treatment plant flow (m ³ /d)	2.000
Conditions and Measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. Waste 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 substance is generated.	

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

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with

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the Petrorisk model.

SECTION 4**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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.

Risk Management Measures are based on qualitative risk characterisation.

Section 4.2 -Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).