Diesel
Safety Data Sheet
according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Date of issue: 01/09/2011 Revision date: 26/11/2021 Supersedes: 24/01/2020 Version: 3.0

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

1.1. Product identifier

Product form : Mixture
Trade name : Diesel
Product code : 400000156
Type of product : Fuel
Synonyms : Sulphur Free Diesel [SFD] / Ultra Low Sulphur Diesel [ULSD] / BF AGO 10ppmS B7 Udy Umk United Kingdom
Product group : Trade product
Other means of identification : BS EN 590 : 2013 + A1: 2017

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

1.2.1. Relevant identified uses

Intended for general public
Industrial/Professional use spec : Industrial
Used in closed systems
Use of the substance/mixture : Fuel
See the list of identified uses and exposure scenarios in the annex of the safety data sheet.
Function or use category : Fuels

Title	Life cycle stage	Use descriptors
Manufacture of substance	Industrial, Manufacture	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28, ERC1, ESVOC SPERC 1.1.v1
Formulation & (re)packing of substances and mixtures	Industrial, Formulation	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC28, ERC2, ESVOC SPERC 2.2.v1
Use of substance as intermediate	Industrial	SU8, SU9, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28, ERC6a, ESVOC SPERC 6.1a.v1
Use in Oil and Gas field drilling and production operations	Industrial	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC28, ERC4
Use as a fuel: Industrial	Industrial	PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28, ERC7, ESVOC SPERC 7.12a.v1
Use as a functional fluids: Industrial	Industrial	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC28, ERC7, ESVOC SPERC 7.13a.v1
Use as a fuel: Professional	Professional	PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28, ERC9a, ERC9b, ESVOC SPERC 9.12b.v1
Use as a fuel: Consumer	Consumer	PC13, ERC9a, ERC9b, ESVOC SPERC 9.12c.v1

Full text of use descriptors: see section 16

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Manufacturer

ESSAR OIL (UK) LTD
Stanlow Manufacturing Complex, P.O. Box 3, Ellesmere Port
CH65 4HB - UK
T +44 (0)151 350 4003
sds@essaroil.co.uk

1.4. Emergency telephone number

Emergency number : Essar Oil (UK) Ltd: +44 (0)151 350 4545
NCEC Carechem 24: +44(0)870 190 6777

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flam. Liq. 3	H226
Acute Tox. 4 (Inhalation:vapour)	H332
Skin Irrit. 2	H315

Carc. 2	H351
STOT RE 2	H373
Asp. Tox. 1	H304
Aquatic Chronic 2	H411

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

Flammable liquid and vapour. Harmful if inhaled. Causes skin irritation. Suspected of causing cancer (Dermal). May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure (Dermal, inhalation). May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08 GHS09

Signal word (CLP) : Danger

Hazardous ingredients : GTL; Fuels, Diesel

Hazard statements (CLP) : H226 - Flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H332 - Harmful if inhaled.
H351 - Suspected of causing cancer.
H373 - May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure (in contact with skin, if inhaled).
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements (CLP) : P102 - Keep out of reach of children.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 - Do not breathe vapours, mist, spray, gas.
P273 - Avoid release to the environment.
P280 - Wear protective clothing, protective gloves, eye protection.
P301+P310 - IF SWALLOWED: Immediately call a doctor.
P331 - Do NOT induce vomiting.
P403+P235 - Store in a well-ventilated place. Keep cool.

2.3. Other hazards

Other hazards not contributing to the classification : Electrostatic charges may be generated during handling.

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Comments : Hazard classification of this material is based on the worst possible case

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Fuels, Diesel (Component)	(CAS-No.) 68334-30-5 (EC-No.) 269-822-7 (EC Index-No.) 649-224-00-6 (REACH-no) 01-2119484664-27-0089, UK-01-8130493590-1-0002	<= 100	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation:vapour), H332 Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
GTL (Component)	(CAS-No.) 848301-67-7 (EC-No.) 481-740-5 (REACH-no) 01-0000020118-77, 01-0000020119-75	<= 50.0	Asp. Tox. 1, H304

FAME [Fatty acids, C16-18 and C18-unsatd., Me esters] (Component)	(CAS-No.) 67762-38-3 (EC-No.) 267-015-4 (REACH-no) 01-2119471664-32	<= 7.0	Not classified
FAME [Fatty acids, C14-18 and C16-18-unsatd., Me esters] (Component)	(CAS-No.) 67762-26-9 (EC-No.) 267-007-0 (REACH-no) 01-2119471662-36	<= 7.0	Not classified
FAME [Fatty acids, C10-18 and C12-22-unsatd., C14-18 and C16-18-unsatd. alkyl esters] (Component)	(CAS-No.) 85049-31-6 (EC-No.) 285-200-8 (REACH-no) 01-2119675342-38	<= 7.0	Not classified

Comments : The full UVCB ingredient list is not known

May contain dyes and markers at < 0.20 % v/v for tax purposes and to prevent fraud.

May contain fuel additives in order to meet the identified supply release specification

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Caution. First aider: Pay attention to self-protection!. IF exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice/attention. If experiencing respiratory symptoms: Give oxygen or artificial respiration if necessary. Unconscious: maintain adequate airway and respiration.

First-aid measures after skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Soap may be used. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Do not induce vomiting. Get immediate medical advice/attention. Rinse mouth out with water. Aspiration of this material may cause chemical pneumonia. If vomiting occurs, keep head low so that stomach content does not enter the lungs.

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

Symptoms/effects : Symptoms may be delayed.

Symptoms/effects after inhalation : Inhalation may cause irritation (cough, short breathing, difficulty in breathing). May cause shortness of breath, tightness of the chest, a sore throat and cough. May cause respiratory irritation.

Symptoms/effects after skin contact : Irritation.

Symptoms/effects after eye contact : May cause eye irritation.

Symptoms/effects after ingestion : Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. Risk of lung oedema.

Chronic symptoms : Suspected carcinogen. Irritation of the respiratory tract. May cause damage to organs: liver. thymus. bone marrow. Prolonged or repeated contact may cause skin to become dry or cracked.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. Alcohol resistant foam. Dry powder. Sand. Carbon dioxide.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour. Heavier than air, vapours may travel long distances along ground, ignite and flash back to source. Floats on water.

Reactivity in case of fire : Do not scatter spilled material with high-pressure water streams. Reacts violently with water.

Hazardous decomposition products in case of fire : Combustion generates: Carbon oxides (CO, CO2). Sulphur oxides. Toxic fumes may be released.

5.3. Advice for firefighters

Precautionary measures fire : Keep upwind. Exposure to fire/heat: seal off low-lying areas. Heavy vapours. Shut off low-level openings in the vicinity (ventilation shafts, drains...). Consider evacuation. Stop leak if safe to do so. Fight fire from safe distance and protected location. or. Fight fire from a safe distance or use hoses with support or cannon engine. Close doors and windows of adjacent premises.

Firefighting instructions	: Keep public away from danger area. If no hazard for/from the surroundings: controlled burning. Shut off source of fuel if possible, and allow fire to burn out. or. Fight fire with normal precautions from a reasonable distance. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Eliminate all ignition sources if safe to do so. Dilute combustible/toxic gases/vapours with water spray. Contain the extinguishing fluids by bunding. Use water spray or fog for cooling exposed containers. Risk of explosion if heated under confinement. Physical explosion risk: extinguish/cool from behind cover.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Do not enter fire area without proper protective equipment, including respiratory protection. Self-contained breathing apparatus. Complete protective clothing.
Other information	: Prevent fire fighting water from entering the environment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Contact with walking surface may result in formation of slippery film/falling hazard. Ventilate area. Eliminate every possible source of ignition. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Emergency procedures	: Only qualified personnel equipped with suitable protective equipment may intervene. No open flames, no sparks, and no smoking. Avoid breathing vapours, mist, spray, gas. Avoid contact with skin, eyes and clothing. Keep upwind.

6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	: Mark out the contaminated area with signs and prevent access to unauthorized personnel. Monitor the atmosphere at regular intervals. All equipment used when handling the product must be grounded. Stop leak if safe to do so.

6.2. Environmental precautions

Avoid release to the environment. Do not allow to enter drains or water courses. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Notify authorities if product enters sewers or public waters. Floats on water.

6.3. Methods and material for containment and cleaning up

For containment	: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Cover liquid spill with foam or sand/earth. Cover with: Dry powder. Dilute/disperse combustible gas/vapour with water curtain. Floats on water. On water, recover/skim from surface and pour out in disposal container.
Methods for cleaning up	: Ground and bond container and receiving equipment. Use explosion-proof equipment. Use non-sparking tools. Take precautionary measures against static discharge. Contain large spillage with sand or earth. Cover spill with non combustible material, e.g.: sand, earth, vermiculite. Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. Clean contaminated surfaces with an excess of water. Contaminated product, soil or water intended for disposal have to be considered as dangerous. Assumes no free product in wastewater stream; oil-water separation (e.g. via oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances. Wash clothing and equipment after handling.
Other information	: Dispose of materials or solid residues at an authorized site. This chemical is subject to the International Convention for the Prevention of Pollution from Ships (MARPOL). Maritime spillages should be dealt with using Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL Annex I Regulation 37. Maritime spillages should be dealt with as per MARPOL Annex II Regulation 17. In the case of ships to which MARPOL Annex I Regulation 37 also applies, such a plan may be combined with the Shipboard Oil Pollution Emergency Plan (SOPEP).

6.4. Reference to other sections

For further information see section 4. First aid measures. For further information refer to section 8: "Exposure controls/personal protection". For further information, refer to section 10 : "Stability and Reactivity". For further information refer to section 13. Disposal considerations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed	: In use, may form flammable vapour-air mixture. As a result of flow, agitation, etc, electrostatic charges can be generated.

Precautions for safe handling	: Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. or. Provide good ventilation in process area to prevent formation of vapour. Flammable vapours may accumulate in the container. Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. Use explosion-proof equipment. Wear personal protective equipment. Avoid breathing vapours, mist, spray, gas. Avoid contact with skin and eyes. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Have emergency equipment (for fires, spills, leaks, etc.) readily available.
Handling temperature	: Assumes product is handled at ambient temperatures unless stated otherwise. For elevated temperature operations as defined by the "Formulation and (re)packaging of substances and mixtures" and "Use in oil and gas field drilling and production operations - Industrial" exposure scenarios (see annex to this document), handling temperatures should not exceed 60.0 °C. For elevated temperature operations as defined in the "Use as functional fluids - Industrial" exposure scenario (see annex to this document), handling temperatures should not exceed 80.0 °C.
Hygiene measures	: Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Ground/bond container and receiving equipment. Proper grounding procedures to avoid static electricity should be followed. Use only non-sparking tools. Take precautionary measures against static discharge.
Storage conditions	: Store in a well-ventilated place. Keep cool. Store locked up. Flammable vapours can accumulate in head space of closed systems. Bund storage facilities to prevent soil and water pollution in the event of spillage. Storage of this product may be subject to the Control of Pollution (Oil Storage) (England) Regulations 2001. Additional guidance may be obtained from the Environment Agency.
Incompatible products	: Oxidizing agent. Strong acids. Strong bases.
Heat and ignition sources	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Information on mixed storage	: Store away from strong oxidizers, strong bases, strong acids.
Storage area	: May be stored under inert gas. Dike and vent equipped storage tanks. Provide proper grounding. Storage of this product may be subject to the Control of Pollution (Oil Storage) (England) Regulations 2001. Additional guidance may be obtained from the Environment Agency.

7.3. Specific end use(s)

Do not ingest. Use as a fuel. Section. 1.2. Relevant identified uses of the substance or mixture and uses advised against.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Diesel	
EU - Occupational Exposure Limits	
IOELV TWA (mg/m³)	0.05 mg/m³ (The limit value shall apply from 21 February 2023. For underground mining and tunnel construction the limit value shall apply from 21 February 2026)

Monitoring methods	
Monitoring methods	Determination of aromatic hydrocarbons in the air of workplace,Personal monitoring,Monitor the atmosphere at regular intervals,Workplace exposure - General requirements for the performance of procedures for the measurement of chemical agents
Biological monitoring methods	A specific exposure sampling method is not available

Diesel	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	4288 mg/m³
Acute - local effects, dermal	Low hazard (no threshold derived)
Acute - local effects, inhalation	No hazard identified
Long-term - systemic effects, dermal	2.91 mg/kg bodyweight/day
Long-term - local effects, dermal	High hazard (no threshold derived)

Diesel	
Long-term - systemic effects, inhalation	68.34 mg/m³
Long-term - local effects, inhalation	No hazard identified
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	2572.8 mg/m³
Acute - systemic effects, oral	No hazard identified
Acute - local effects, dermal	Low hazard (no threshold identified)
Acute - local effects, inhalation	No hazard identified
Long-term - systemic effects,oral	1.25 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	20.22 mg/m³
Long-term - systemic effects, dermal	1.25 mg/kg bodyweight/day
Long-term - local effects, dermal	High hazard (no threshold erived)
Long-term - local effects, inhalation	No hazard identified
DNEL/DMEL (additional information)	
Additional information	Data from Chemical Safety Report [CONCAWE] for main constituent.
PNEC (Water)	
PNEC aqua (freshwater)	Substance is a UVCB - testing technically not feasible
PNEC aqua (marine water)	Substance is a UVCB - testing technically not feasible
PNEC aqua (intermittent, freshwater)	Substance is a UVCB - testing technically not feasible
PNEC aqua (intermittent, marine water)	Substance is a UVCB - testing technically not feasible
PNEC (Sediment)	
PNEC sediment (freshwater)	Substance is a UVCB - testing technically not feasible
PNEC sediment (marine water)	Substance is a UVCB - testing technically not feasible
PNEC (Soil)	
PNEC soil	Substance is a UVCB - testing technically not feasible
PNEC (Oral)	
PNEC oral (secondary poisoning)	≈ 8.77 mg/kg wet weight [Whole body, total hydrocarbon]
PNEC (STP)	
PNEC sewage treatment plant	Substance is a UVCB - testing technically not feasible
PNEC (additional information)	
Additional information	Product is a UVCB and conventional methods of deriving a PNEC are not appropriate

8.2. Exposure controls

Appropriate engineering controls:

Industrial and professional. Perform risk assessment prior to use. A specific assessment of inhalation risks from the presence of flammable or toxic gases in tank headspaces, confined spaces, product residue, tank waste water, waste water and unintentional releases should be made to help determine controls appropriate to local circumstances. Ensure adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. Provide local exhaust or general room ventilation to minimize mist and/or vapour concentrations. Use only explosion-proof equipment.

Personal protective equipment:

Avoid all unnecessary exposure. Use personal protective equipment as required. A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered: Full protective flameproof clothing. Safety glasses. Gloves. Head/neck protection.

Materials for protective clothing:
Flame retardant antistatic protective clothing. EN ISO 14116

Hand protection:
Chemical resistant gloves (according to European standard NF EN 374 or equivalent). Choosing the proper glove is a decision that depends not only on the type of material, but also on other quality features, which differ for each manufacturer. Please follow the instructions related to the permeability and the penetration time provided by the manufacturer

Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Reusable gloves, Disposable gloves	Nitrile rubber	5 (> 240 minutes)			EN ISO 374
Reusable gloves, Disposable gloves	Neoprene rubber (HNBR)	3 (> 60 minutes)			EN ISO 374
Reusable gloves, Disposable gloves	Polyvinylchloride (PVC)	3 (> 60 minutes)			EN ISO 374

Eye protection:

Chemical goggles or safety glasses. EN 166. Non-vented

Skin and body protection:

Safety boots. EN ISO 20345. Head protection

Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. Full face mask. EN 136. or. Half-mask. EN 405. Filter. Type A - High-boiling (>65 °C) organic compounds

Personal protective equipment symbol(s):

Environmental exposure controls:

Avoid release to the environment. Do not exceed the occupational exposure limits (OEL).

Consumer exposure controls:

Do not ingest. If swallowed then seek immediate medical assistance.

Other information:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear.
Colour	: Colourless. to. straw yellow.
Odour	: Aromatic odour.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: < 0 °C (Data from CONCAWE Dossier)
Freezing point	: No data available
Boiling point	: > 150 °C (Boiling point range is typically 150 °C to 380 °C - from analytical data)
Flash point	: ≈ 58 °C (Value from analytical data)
Auto-ignition temperature	: >= 225 °C (Data from CONCAWE Dossier)
Decomposition temperature	: No data available
Flammability (solid, gas)	: Not applicable
Vapour pressure	: ≈ 0.4 kPa (at 40 °C - Data from CONCAWE Dossier)
Relative vapour density at 20 °C	: No data available
Relative density	: 0.8 - 0.91 g/cm3 (Data from CONCAWE dossier and sample analysis)
Density	: 820 - 845 kg/m³
Solubility	: Substance floats in water. Water: (Not determined) Ethanol: (Not determined) Ether: (Not determined) Acetone: (Not determined) Organic solvent:(Not determined)

Log Pow	: (Not determined)
Log Kow	: > 3
Viscosity, kinematic	: ≈ 2 (2 - 4.5) mm²/s at 40 °C
Viscosity, dynamic	: (Not determined)
Explosive properties	: Not classified as explosive according to EC criteria, but may present risks in the event of a fire. Risk of explosion if heated under confinement.
Oxidising properties	: Not applicable. Non oxidizing material according to EC criteria.
Lower explosive limit (LEL)	: 1 (estimated value)
Upper explosive limit (UEL)	: 6 (estimated value)

9.2. Other information

Other properties	: Electrostatic charges may be generated during handling.
Additional information	: Data given is from product knowledge or from similar components.

SECTION 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapour. The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Avoid contact with hot surfaces. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Oxidizing agent. Strong acids. Strong bases.

10.6. Hazardous decomposition products

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	: Harmful if inhaled.

Diesel	
ATE CLP (oral)	5000 mg/kg bodyweight
ATE CLP (dermal)	2597.4 mg/kg bodyweight
ATE CLP (vapours)	4.1 mg/l/4h

Fuels, Diesel (68334-30-5)	
LD50 oral rat	> 5000 mg/kg bodyweight : equivalent or similar to OECD Guideline 401
LD50 dermal rabbit	> 4300 mg/kg bodyweight : equivalent or similar to OECD Guideline 402
LC50 inhalation rat (Vapours - mg/l/4h)	≈ 4.1 mg/l/4h [aerosol] : equivalent or similar to OECD Guideline 403

GTL (848301-67-7)	
LD50 oral rat	> 5000 mg/kg (OECD 420: Acute Oral toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral)
LD50 dermal rat	> 2000 mg/kg (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Read-across, Dermal)

FAME [Fatty acids, C10-18 and C12-22-unsatd., C14-18 and C16-18-unsatd. alkyl esters] (85049-31-6)	
LD50 oral rat	> 2000 mg/kg bodyweight (OECD 423: Acute Oral Toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral)
LD50 dermal rabbit	> 2000 mg/kg bodyweight (EPA OPPTS 870.1200: Acute Dermal Toxicity, Rabbit, Read-across, Dermal)

FAME [Fatty acids, C14-18 and C16-18-unsatd., Me esters] (67762-26-9)	
LD50 oral rat	> 5000 mg/kg bodyweight (OECD 401: Acute Oral Toxicity, Rat, Male / female, Experimental value, Oral, 14 day(s))
LD50 dermal rabbit	> 2000 mg/kg bodyweight (EPA OPPTS 870.1200: Acute Dermal Toxicity, Rabbit, Read-across, Dermal)

FAME [Fatty acids, C16-18 and C18-unsatd., Me esters] (67762-38-3)	
LD50 oral rat	> 5000 mg/kg bodyweight (OECD 401: Acute Oral Toxicity, Rat, Male / female, Experimental value, Oral, 14 day(s))
LD50 dermal rabbit	> 2000 mg/kg bodyweight (EPA OPPTS 870.1200: Acute Dermal Toxicity, Rabbit, Read-across, Dermal)

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met)

Respiratory or skin sensitisation : Not classified (Based on available data, the classification criteria are not met. Not expected to be a sensitiser)

Germ cell mutagenicity : Not classified (Based on available data, the classification criteria are not met)

Carcinogenicity : Suspected of causing cancer.

Diesel	
IARC group	2B - Possibly carcinogenic to humans

Fuels, Diesel (68334-30-5)	
LOAEL, mammalian, Chronic, Dermal, male, mouse	= 25 mg/kg bw/day (long term 3 times per week for life, no guideline followed)

Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met)

STOT-single exposure : Not classified (Based on available data, the classification criteria are not met)

STOT-repeated exposure : May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure (in contact with skin, if inhaled).

Fuels, Diesel (68334-30-5)	
NOAEL (dermal, rat/rabbit, 90 days)	≈ 30 mg/kg bodyweight/day [rat, sub-chronic, systemic effects] : equivalent or similar to OECD Guideline 411 (Subchronic Dermal Toxicity: 90-Day Study)
NOAEC (inhalation, rat, vapour, 90 days)	> 1.71 mg/l [sub-chronic, systemic effects] : equivalent or similar to OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)

Aspiration hazard : May be fatal if swallowed and enters airways.

Diesel	
Viscosity, kinematic	≈ 2 (2 - 4.5) mm²/s at 40 °C
Hydrocarbon	Yes

Potential adverse human health effects and symptoms : Harmful if inhaled. May be fatal if swallowed and enters airways. Causes skin irritation. Suspected of causing cancer. May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

Other information : Information given is based on product data, knowledge of the components and the toxicology of similar products. Likely routes of exposure: inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Information given is based on knowledge of the components and the ecotoxicology of similar products.

Ecology - air : Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009). None of the known components is included in the list of fluorinated greenhouse gases (Regulation (EC) No 842/2006). None of the known components is included in the list of substances which may contribute to the greenhouse effect (IPCC).

Ecology - water : Toxic to aquatic life with long lasting effects.

Acute aquatic toxicity : Not classified

Chronic aquatic toxicity : Toxic to aquatic life with long lasting effects.

Diesel	
LC50 fish 1	21 mg/l [LL50 value (based on mortality) : according to OECD Guideline 203 (Fish, Acute Toxicity Test)]
EC50 Daphnia 1	68 mg/l [EL50 value (based on mobility) : according to OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)]
ErC50 (algae)	22 mg/l [ErL50 value (based on growth rate) : according to OECD Guideline 201 (Alga, Growth Inhibition Test - before 23 March 2006]
NOEC chronic fish	0.083 mg/l [estimated No Observed Effect Level based on mortality]
NOEC chronic crustacea	0.2 mg/l [estimated No Observed Effect Level based on mortality]
NOEC chronic algae	3.217 mg/l [estimated No Observed Effect Level based on mortality]

12.2. Persistence and degradability

Diesel	
Persistence and degradability	Readily biodegradable. Biodegradable in water. No significant hydrolysis. Does not have the potential to undergo photolysis in water and soil.

12.3. Bioaccumulative potential

Diesel	
Log Pow	(Not determined)
Log Kow	> 3
Bioaccumulative potential	Substance is a UVCB and may contain components with the potential to bioaccumulate.

12.4. Mobility in soil

Diesel	
Ecology - soil	If product enters soil, one or more constituents may be mobile and will contaminate groundwater.

12.5. Results of PBT and vPvB assessment

Diesel
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Other adverse effects

Additional information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Disposal must be done according to official regulations.

Waste treatment methods : Assure that emissions are compliant with all applicable air pollution control regulations.

Sewage disposal recommendations : Do not dispose of waste into sewer.

Product/Packaging disposal recommendations : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. Use appropriate containment to avoid environmental contamination.

Additional information : Handle empty containers with care because residual vapours are flammable.

Ecology - waste materials : Hazardous waste due to toxicity. Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / ADN / IMDG

ADR	IMDG	ADN
14.1. UN number		
UN 1202	UN 1202	UN 1202
14.2. UN proper shipping name		
DIESEL FUEL	DIESEL FUEL	DIESEL FUEL
Transport document description		
UN 1202 DIESEL FUEL, 3, III, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 1202 DIESEL FUEL, 3, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 1202 DIESEL FUEL, 3, III, ENVIRONMENTALLY HAZARDOUS

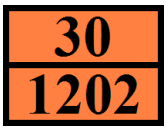
14.3. Transport hazard class(es)		
3	3	3
		
14.4. Packing group		
III	III	III
14.5. Environmental hazards		
Dangerous for the environment : Yes	Dangerous for the environment : Yes Marine pollutant : Yes	Dangerous for the environment : Yes
No supplementary information available		

14.6. Special precautions for user

Special transport precautions : Refer to protective measures listed in Sections 7 and 8

Overland transport

Classification code (ADR) : F1
Special provisions (ADR) : 640K, 363, 664
Limited quantities (ADR) : 5l
Excepted quantities (ADR) : E1
Packing instructions (ADR) : P001, IBC03, LP01, R001
Mixed packing provisions (ADR) : MP19
Portable tank and bulk container instructions (ADR) : T2
Portable tank and bulk container special provisions (ADR) : TP1
Tank code (ADR) : LGBF
Vehicle for tank carriage : FL
Transport category (ADR) : 3
Special provisions for carriage - Packages (ADR) : V12
Special provisions for carriage - Operation (ADR) : S2
Hazard identification number (Kemler No.) : 30
Orange plates :



Tunnel restriction code (ADR) : D/E
EAC code : 3Y

Transport by sea

Transport regulations (IMDG) : MARPOL Annex I rules apply for bulk shipments by sea.
Special provisions (IMDG) : 363
Limited quantities (IMDG) : 5 L
Excepted quantities (IMDG) : E1
Packing instructions (IMDG) : P001, LP01
IBC packing instructions (IMDG) : IBC03
Tank instructions (IMDG) : T2
Tank special provisions (IMDG) : TP1
EmS-No. (Fire) : F-E
EmS-No. (Spillage) : S-E
Stowage category (IMDG) : A
Properties and observations (IMDG) : Immiscible with water.

Inland waterway transport

Classification code (ADN) : F1
Special provisions (ADN) : 363, 640K
Limited quantities (ADN) : 5 L
Excepted quantities (ADN) : E1

Carriage permitted (ADN)	: T
Equipment required (ADN)	: PP, EX, A
Ventilation (ADN)	: VE01
Number of blue cones/lights (ADN)	: 0

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

IBC code : Not applicable.

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

Reference code	Applicable on	Entry title or description
3(a)	Diesel ; Fuels, Diesel	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F
3(b)	Diesel ; GTL ; Fuels, Diesel	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10
3(c)	Diesel ; Fuels, Diesel	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1
28.	Diesel ; Fuels, Diesel	Substances which are classified as carcinogen category 1A or 1B in Part 3 of Annex VI to Regulation (EC) No 1272/2008 and are listed in Appendix 1 or Appendix 2, respectively.
40.	Diesel ; Fuels, Diesel	Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.

Contains no substance on the REACH candidate list
Contains no REACH Annex XIV substances
Contains no substance subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.
Substance(s) are not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC.

Directive 2012/18/EU (SEVESO III)
Seveso Additional information : 34. Petroleum products and alternative fuels (a) gasolines and naphthas, (b) kerosenes (including jet fuels), (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams) (d) heavy fuel oils (e) alternative fuels serving the same purposes and with similar properties as regards flammability and environmental hazards as the products referred to in points (a) to (d)

15.1.2. National regulations

United Kingdom

British National Regulations : Storage of this product may be subject to the Control of Pollution (Oil Storage) (England) Regulations 2001. Additional guidance may be obtained from the Environment Agency.
Control of Substances Hazardous to Health Regulations 2002 (as amended).
EH40/2005 Workplace exposure limits.
Health and Safety at Work Act.
The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG Regs).
The Dangerous Substances and Explosive Atmospheres Regulations 2002.
The Personal Protective Equipment at Work Regulations 1992 [SI 1992 No. 2966].

15.2. Chemical safety assessment

A chemical safety assessment has been carried out

For the following substances of this mixture a chemical safety assessment has been carried out
Fuels, Diesel

SECTION 16: Other information

Indication of changes:

Section	Changed item	Change	Comments
1.2	Use of the substance/mixture	Modified	
2.2	Precautionary statements (CLP)	Modified	
4.1	First-aid measures after ingestion	Modified	
4.2	Symptoms/effects after inhalation	Modified	
4.2	Chronic symptoms	Modified	
5.1	Suitable extinguishing media	Modified	
5.2	Reactivity in case of fire	Modified	
5.3	Precautionary measures fire	Modified	
5.3	Firefighting instructions	Modified	
5.3	Protection during firefighting	Modified	
6.1	General measures	Modified	
6.1	Emergency procedures	Modified	
6.1	Emergency procedures	Modified	
6.2	Environmental precautions	Modified	
6.3	For containment	Modified	
6.4	Reference to other sections (8, 13)	Modified	
7.1	Precautions for safe handling	Modified	
7.1	Hygiene measures	Modified	
7.1	Handling temperature	Added	
7.2	Technical measures	Modified	
7.2	Storage conditions	Modified	
7.2	Incompatible products	Modified	
7.2	Heat and ignition sources	Modified	
7.2	Prohibitions on mixed storage	Modified	
7.2	Storage area	Modified	
7.3	Specific end uses	Modified	
8	Monitoring methods	Modified	
8.1	Acute - local effects, dermal	Modified	
8.1	Acute - local effects, inhalation	Modified	
8.1	Acute - systemic effects, dermal	Modified	
8.1	Acute - systemic effects, inhalation	Modified	
8.1	Acute - systemic effects, oral	Modified	
8.1	Long-term - local effects, dermal	Modified	
8.1	Long-term - local effects, inhalation	Modified	
8.1	Long-term - systemic effects, dermal	Modified	
8.1	Long-term - systemic effects, inhalation	Modified	
8.1	Long-term - systemic effects,oral	Modified	
8.1	Acute - local effects, dermal	Modified	
8.1	Acute - local effects, inhalation	Modified	

8.1	Acute - systemic effects, dermal	Modified	
8.1	Acute - systemic effects, inhalation	Modified	
8.1	Long-term - local effects, dermal	Modified	
8.1	Long-term - local effects, inhalation	Modified	
8.1	Long-term - systemic effects, dermal	Modified	
8.1	Long-term - systemic effects, inhalation	Modified	
8.1	PNEC aqua (freshwater)	Added	
8.1	PNEC aqua (marine water)	Added	
8.1	PNEC aqua (intermittent, freshwater)	Added	
8.1	PNEC aqua (intermittent, marine water)	Added	
8.1	PNEC sediment (freshwater)	Added	
8.1	PNEC sediment (marine water)	Added	
8.1	PNEC soil	Added	
8.1	PNEC oral (secondary poisoning)	Added	
8.1	PNEC sewage treatment plant	Added	
8.2	Appropriate engineering controls	Modified	
8.2	Personal protective equipment	Modified	
8.2	Environmental exposure controls	Modified	
8.2	Other information	Modified	
8.2	Materials for protective clothing	Modified	
8.2	Eye protection	Modified	
8.2	Skin and body protection	Modified	
8.2	Hand protection	Modified	
8.2	Respiratory protection	Modified	
8.2	Consumer exposure controls	Added	
9.1	Melting point	Added	
9.1	Oxidising properties	Added	
9.1	Freezing point	Added	
9.1	Viscosity, kinematic	Modified	
9.1	Relative density	Added	
9.1	Explosive properties	Modified	
9.1	Vapour pressure	Modified	
9.1	Auto-ignition temperature	Modified	
9.1	Density	Modified	
9.2	Other properties	Added	
10.5	Incompatible materials	Modified	
11.1	Other information	Modified	
11.1	IARC group	Modified	
11.1	ATE CLP (oral)	Added	
11.1	ATE CLP (vapours)	Added	
11.1	Potential adverse human health effects and symptoms	Added	

11.1	ATE CLP (dermal)	Added	
12.1	Ecology - air	Modified	
12.1	Ecology - general	Modified	
12.1	Ecology - water	Added	
12.1	LC50 fish 1	Modified	
12.1	EC50 Daphnia 1	Modified	
12.1	ErC50 (algae)	Modified	
12.1	NOEC chronic fish	Modified	
12.1	NOEC chronic crustacea	Modified	
12.1	NOEC chronic algae	Modified	
13.1	Waste treatment methods	Added	
13.1	Sewage disposal recommendations	Added	
13.1	Product/Packaging disposal recommendations	Added	
13.1	Ecology - waste materials	Added	
14.6	Special transport precautions	Modified	
15.1	British National Regulations	Modified	
15.1	Seveso Additional information	Added	
16	Data sources	Modified	
16	Abbreviations and acronyms	Modified	
16	Training advice	Modified	

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DNEL	Derived-No Effect Level
DMEL	Derived Minimal Effect level
EC50	Median effective concentration
ECETOC TRA	European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC) Targeted Risk Assessment (TRA)
EN	European Norm
EU	European Union
IARC	International Agency for Research on Cancer
IBC	Intermediate bulk container
IMDG	International Maritime Dangerous Goods
ISO	International Standards
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
LTD	Limited
MARPOL	MARPOL 73/78 is the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978.
NF	National Foreword
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration

PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RMM	Risk management measures
SDS	Safety Data Sheet
SOPEP	Ship Oil Pollution Emergency Plan
SOLAS	[The International Convention for the] Safety of Life at Sea
STP	Sewage treatment plant
UVCB	(Substance of) Unknown or Variable composition
vPvB	Very Persistent and Very Bioaccumulative

Data sources : Source: European Chemicals Agency, http://echa.europa.eu/. REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. Hazard classification and labelling of petroleum substances in the European Economic Area (CONCAWE). Manufacturer Information.

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training. Training staff on good practice. Use only by trained employees according to users risk assessment at workplace.

Full text of H- and EUH-statements:	
Acute Tox. 4 (Inhalation:vapour)	Acute toxicity (inhalation:vapour) Category 4
Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category 2
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 2	Carcinogenicity, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Full text of use descriptors	
ERC1	Manufacture of substances
ERC2	Formulation of preparations
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 thermo-plastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7	Industrial use of substances in closed systems
ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
ESVOC SPERC 1.1.v1	Manufacture of substances: Industrial (SU8, SU9)
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)

ESVOC SPERC 6.1a.v1	Manufacture of substances: Industrial (SU8, SU9)
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)
ESVOC SPERC 7.13a.v1	Functional Fluids: Industrial (SU3)
ESVOC SPERC 9.12b.v1	Use as a fuel: Professional (SU22)
ESVOC SPERC 9.12c.v1	Use as a fuel: Consumer (SU21)
PC13	Fuels
PROC1	Use in closed process, no likelihood of exposure
PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC28	Manual maintenance (cleaning and repair) of machinery
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals

SDS EU (REACH Annex II)

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

Annex to the safety data sheet

Product exposure scenario(s)	
ES Type	**ES title**
Worker	Manufacture of substance
Worker	Formulation & (re)packing of substances and mixtures - Industrial
Worker	Use of substance as intermediate
Worker	Use in Oil and Gas field drilling and production operations: Industrial
Worker	Use as a fuel: Industrial
Worker	Use as a functional fluids: Industrial
Worker	Use as a fuel: Professional
Consumer	Use as a fuel: Consumer

1. Exposure scenario

Manufacture of substance

ES Type: Worker	Association ref code: CONC.1.LU.1

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28 ERC1 ESVOC SPERC 1.1.v1
Processes, tasks, activities covered	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities Industrial use Manufacture

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28)

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)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. For further specification, refer to section 8 of the SDS.	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection	

	point. Ensure control measures are regularly inspected and maintained. Consider the need for risk based health surveillance.	
General exposures (closed systems)	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes activities are above room temperature	
General exposures (closed systems),With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Ensure operation is undertaken outdoors. Assumes activities are above room temperature	
General exposures (closed systems),Batch process,With occasional controlled exposure	Provide extract ventilation to points where emissions occur. Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes activities are above room temperature	
General exposures (open systems)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Process sampling	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Laboratory activities	No other specific measures identified. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use	
Bulk transfers,Closed systems	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Bulk transfers,Open systems	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC1, ESVOC SPERC 1.1.v1)

ERC1	Manufacture of substances
ESVOC SPERC 1.1.v1	Manufacture of substances: Industrial (SU8, SU9)

Product characteristics		
Physical form of product	Liquid	
Vapour pressure	≈ 0.4 kPa	
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1

	Regional use tonnage	26000000 t/yr
	Fraction of Regional tonnage used locally:	0.75
	Annual site tonnage	19000000 t/yr
	Maximum daily site tonnage	64000000 kg/day
Frequency and duration of use	Continuous release,Emission days	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.0099
	Release fraction to wastewater from process (initial release prior to RMM):	0.0000004
	Release fraction to soil from process (initial release prior to RMM):	0.0001
Risk Management Measures		
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. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to municipal sewage treatment plant, no onsite 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	94.3 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %
Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	68000000 kg/day
	Assumed domestic sewage treatment plant flow	10000 m³/d
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	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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)

1. Exposure scenario

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

ES Type: Worker	Association ref code: CONC.2.FU.1A

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC28 ERC2 ESVOC SPERC 2.2.v1
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities Industrial use Formulation

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15)

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)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. For further specification, refer to section 8 of the SDS.	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions	

	to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly inspected and maintained. Consider the need for risk based health surveillance.	
General exposures (closed systems),Batch process,With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
General exposures (open systems)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Batch processes at elevated temperatures,Use in contained systems	Provide extract ventilation to points where emissions occur. Handle substance within a closed system. Assumes use at not more than 20°C above ambient temperature.	
Process sampling	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Laboratory activities	No other specific measures identified. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use	
Bulk transfers,Dedicated facility	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Mixing operations (open systems)	Provide extract ventilation to points where emissions occur. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Manual,Transfer from/pouring from containers,Non-dedicated facility	Use drum pumps. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Drum/batch transfers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Production or preparations or articles by tabletting, compression, extrusion or pelletisation	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	

Drum and small package filling	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC2, ESVOC SPERC 2.2.v1)

ERC2	Formulation of preparations
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)

Product characteristics	
Physical form of product	Liquid
Vapour pressure	≈ 0.4 kPa
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	30000000 t/yr
	Fraction of Regional tonnage used locally:	0.001
	Annual site tonnage	30000 t/yr
	Maximum daily site tonnage	100000 kg/day
Frequency and duration of use	Continuous release,Emission days	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	0.01
	Release fraction to wastewater from process (initial release prior to RMM):	0.00005
	Release fraction to soil from process (initial release prior to RMM):	0.0001

Risk Management Measures		
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. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
	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	94.1 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %
Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on	110000 kg/day

	release following total wastewater treatment removal	
	Assumed domestic sewage treatment plant flow	2000 m³/d
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	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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)

1. Exposure scenario

Use of substance as intermediate

ES Type: Worker	Association ref code: CONC.3.FU.1B

Use descriptors	SU8, SU9 PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28 ERC6a ESVOC SPERC 6.1a.v1
Processes, tasks, activities covered	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container) Industrial use

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28)

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)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly	

	inspected and maintained. Consider the need for risk based health surveillance.	
General exposures (closed systems),Batch process,With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
General exposures (open systems)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Process sampling	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Laboratory activities	No other specific measures identified. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use	
Bulk transfers,Closed systems	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Bulk transfers,Open systems	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC6a, ESVOC SPERC 6.1a.v1)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ESVOC SPERC 6.1a.v1	Manufacture of substances: Industrial (SU8, SU9)

Product characteristics

Physical form of product	Liquid
Vapour pressure	≈ 0.4 kPa
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Operational conditions

Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	950000 t/yr
	Fraction of Regional tonnage used locally:	0.016
	Annual site tonnage	15000 t/yr
	Maximum daily site tonnage	50000 kg/day
Frequency and duration of use	Continuous release,Emission days	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting	Release fraction to air from process (initial release prior to RMM):	0.001

environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	0.00011
	Release fraction to soil from process (initial release prior to RMM):	0.001
Risk Management Measures		
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. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
	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	94.4 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %
Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	54000 kg/day
	Assumed domestic sewage treatment plant flow	2000 m³/d
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	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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)

1. Exposure scenario

Use in Oil and Gas field drilling and production operations: Industrial

ES Type: Worker	Association ref code: CONC.27.FU.6

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC28 ERC4
Processes, tasks, activities covered	Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance Industrial use

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC28)

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)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly	

	inspected and maintained. Consider the need for risk based health surveillance.	
Bulk transfers,Dedicated facility	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Filling of equipment from drums or containers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Drilling mud (re-)formulation,Use in contained batch processes	Handle substance within a closed system	
Drill floor operations	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Operation of solids filtering equipment,elevated temperature	Provide the operation with a properly sited receiving hood. Assumes use at not more than 20°C above ambient temperature.	
Cleaning of solids filtering equipment,Non-dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Treatment and disposal of filtered solids,Use in contained systems	Handle substance within a closed system	
Process sampling	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
General exposures (closed systems),With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
Pouring from small containers,Non-dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
General exposures (open systems)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
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 'basic' employee training. If skin contamination is expected	

	to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC4)

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

Product characteristics		
Physical form of product	Liquid	
Vapour pressure	≈ 0.4 kPa	
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	1
	Regional use tonnage	20000 t/yr
	Fraction of Regional tonnage used locally:	Not applicable
	Annual site tonnage	Not applicable
	Maximum daily site tonnage	Not applicable
Frequency and duration of use	Emission days	Not applicable
Environmental factors not influenced by risk management	Local freshwater dilution factor:	Not applicable
	Local marine water dilution factor:	Not applicable
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	Not applicable
	Release fraction to wastewater from process (initial release prior to RMM):	Not applicable
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Discharge to aquatic environment is restricted (see Section 4.2)	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emission to provide a typical removal efficiency of	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	Not applicable
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	Not applicable
Organisation measures to prevent/limit release from site	Prevent environmental discharge consistent with regulatory requirements	
Conditions and measures related to sewage treatment plant	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	Not applicable
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	Not applicable
	Assumed domestic sewage treatment plant flow	Not applicable
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. Cuttings and process water are disposed according to 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. Cuttings and process water are re-injected according to local and/or national regulations	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment,Qualitative approach used to conclude safe use

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - Environment	Offshore industries. Discharge to aquatic environment is restricted by law and industry prohibits release. OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007. Onshore drilling: Environmental releases are minimized during onshore drilling operations; waste recycling and disposal is managed according to national and/or local regulations. International Finance Corporation 2007. Environmental, Health, and Safety Guidelines: onshore oil and gas development. Mining Waste Directive (2006/21/EC), European Waste Directive (2008/98/EC) and national transpositions, e.g. Novelle des Kreislaufwirtschaftsgesetzes (KrWG) in Germany.

1. Exposure scenario

Use as a fuel: Industrial

ES Type: Worker	Association ref code: CONC.24.FU.12

Use descriptors	PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28 ERC7 ESVOC SPERC 7.12a.v1
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste Industrial use

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
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
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly inspected and maintained. Consider the need for risk based health surveillance.	
Bulk transfers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner	

	equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Drum/batch transfers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
General exposures (closed systems),With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
Use as a fuel,Closed systems	Handle substance within a closed system	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC7, ESVOC SPERC 7.12a.v1)

ERC7	Industrial use of substances in closed systems
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)

Product characteristics	
Physical form of product	Liquid
Vapour pressure	≈ 0.4 kPa
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	3700000 t/yr
	Fraction of Regional tonnage used locally:	0.0001
	Annual site tonnage	1500000 t/yr
	Maximum daily site tonnage	5000000 kg/day
Frequency and duration of use	Continuous release,Emission days	300
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.005
	Release fraction to wastewater from process (initial release prior to RMM):	0.0000011
	Release fraction to soil from process (initial release prior to RMM):	0

Risk Management Measures		
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 municipal sewage treatment plant, no onsite wastewater treatment required.	
	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	94.4 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %

Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	5200000 kg/day
	Assumed domestic sewage treatment plant flow	2000 m³/d
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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 air can be achieved using on-site technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite 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)

1. Exposure scenario

Use as a functional fluids: Industrial

ES Type: Worker	Association ref code: CONC.39.FU.13

Use descriptors	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC28 ERC7 ESVOC SPERC 7.13a.v1
Processes, tasks, activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers Industrial use

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC28)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly inspected and maintained. Consider the need for risk based health surveillance.	
Bulk transfers,Closed systems,With occasional controlled exposure	Handle substance within a closed system	
Drum/batch transfers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin	

	contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Filling of articles/equipment,Closed systems	Transfer via enclosed lines. Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
Filling of equipment from drums or containers,Non-dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
General exposures (closed systems),With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
General exposures (open systems)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
General exposures (open systems),elevated temperature	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
Remanufacture of reject articles	Drain or remove substance from equipment prior to break-in or maintenance. Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS.	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC7, ESVOC SPERC 7.13a.v1)

ERC7	Industrial use of substances in closed systems
ESVOC SPERC 7.13a.v1	Functional Fluids: Industrial (SU3)

Product characteristics		
Physical form of product	Liquid	
Vapour pressure	≈ 0.4 kPa	
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	1400 t/yr
	Fraction of Regional tonnage used locally:	0.0069

	Annual site tonnage	10 t/yr
	Maximum daily site tonnage	500 kg/day
Frequency and duration of use	Continuous release,Emission days	20
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.005
	Release fraction to wastewater from process (initial release prior to RMM):	0.00003
	Release fraction to soil from process (initial release prior to RMM):	0.001
Risk Management Measures		
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. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
	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	29.7 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %
Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	6500 kg/day
	Assumed domestic sewage treatment plant flow	2000 m³/d
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	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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)

1. Exposure scenario

Use as a fuel: Professional

ES Type: Worker	Association ref code: CONC.24.FU.12

Use descriptors	PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28 ERC9a, ERC9b ESVOC SPERC 9.12b.v1
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste Professional use

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC1, PROC2, PROC8a, PROC8b, PROC16, PROC28)

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
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
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure, Liquid with potential for aerosol generation
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours,unless stated differently	
Other given operational conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented,Covers use at ambient temperatures,unless stated differently	

Risk Management Measures

Other risk management measures:

General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	
General measures applicable to all activities	Minimise exposure using measures such as contained and enclosed systems, properly designed and maintained dedicated facilities and suitable general/local exhaust ventilation. Drain down and flush system prior to equipment break-in or maintenance. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable coveralls to prevent exposure to the skin. Wear suitable gloves tested to EN374. Wear respiratory protection when its use is identified for certain contributing scenarios. Clear spills immediately. Dispose of this material and its container at hazardous or special waste collection point. Ensure control measures are regularly inspected and maintained. Consider the need for risk based health surveillance.	
Bulk transfers,Dedicated facility	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner	

	equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
Drum/batch transfers,Dedicated facility	Use drum pumps. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
refuelling	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer.	
General exposures (closed systems),With occasional controlled exposure	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure	
Use as a fuel,Closed systems	Handle substance within a closed system	
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 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. Clear spills immediately	
Storage,With occasional controlled exposure	Store substance within a closed system	

2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b, ESVOC SPERC 9.12b.v1)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
ESVOC SPERC 9.12b.v1	Use as a fuel: Professional (SU22)

Product characteristics	
Physical form of product	Liquid
Vapour pressure	≈ 0.4 kPa
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	6800000 t/yr
	Fraction of Regional tonnage used locally:	0.0005
	Annual site tonnage	3400 t/yr
	Maximum daily site tonnage	9300 kg/day
Frequency and duration of use	Continuous release,Emission days	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from wide dispersive use (regional only):	0.0001
	Release fraction to wastewater from wide dispersive use:	0.00001
	Release fraction to soil from wide dispersive use (regional only):	0.00001

Risk Management Measures		
Technical conditions and measures at process level	Common practices vary across sites thus conservative process release estimates used	

(source) to prevent release		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
	Treat air emission to provide a typical removal efficiency of	Not applicable
	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	38.8 %
	If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	0 %
Organisation 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 sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	110000 kg/day
	Assumed domestic sewage treatment plant flow	2000 m³/d
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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 dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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)

1. Exposure scenario

Use as a fuel: Consumer

ES Type: Consumer	Association ref code: CONC.26.FU.12

Use descriptors	PC13 ERC9a, ERC9b ESVOC SPERC 9.12c.v1
Processes, tasks, activities covered	Covers consumer uses in liquid fuels Consumer use

2. Operational conditions and risk management measures

2.1 Contributing scenario consumer end-use (PC13)

PC13	Fuels

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 %, unless stated differently

Operational conditions

Amounts used	Annual site tonnage	
Frequency and duration of use	Unless otherwise stated:Covers use up to	10 events per day
Other given operational conditions affecting consumers exposure	Unless otherwise stated:Covers use at ambient temperatures	

Risk Management Measures

Conditions and measures related to information and behavioural advice to consumers	Fuels. Liquid: Automotive Refuelling	
	For each use event, covers use amounts up to :	44000 g
	Covers exposure up to	0.05 hr/event
	Covers outdoor use	
	Assumes that potential dermal contact is limited to hands.	Palm of one hand
	No specific risk management measure identified beyond those operational conditions stated	
	Fuels. Liquid: Home space heater fuel	
	For each use event, covers use amounts up to :	3320 g
	Covers exposure up to	0.033 hr/event
	Assumes that potential dermal contact is limited to hands.	Palm of one hand
	No specific risk management measure identified beyond those operational conditions stated	
	Fuels. Liquid: Garden Equipment - Refuelling	
	For each use event, covers use amounts up to :	750 g
	Covers exposure up to	0.033 hr/event
	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.	
	No specific risk management measure identified beyond those operational conditions stated	

Other risk management measures:

General measures (skin irritants)	Ensure there is no direct skin contact with product. Wash off any skin contamination immediately.	
General measures,Flammability	For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8.	
General measures,Aspiration hazard	Do not ingest. If swallowed then seek immediate medical assistance	

2.2 Contributing scenario controlling environmental exposure (ERC9a, ERC9b, ESVOC SPERC 9.12c.v1)

ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
ESVOC SPERC 9.12c.v1	Use as a fuel: Consumer (SU21)

Product characteristics

Physical form of product	Liquid	
Vapour pressure	≈ 0.4 kPa	
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic	
Operational conditions		
Amounts used	Fraction of EU tonnage used in region:	0.1
	Regional use tonnage	19000000 t/yr
	Fraction of Regional tonnage used locally:	0.0005
	Annual site tonnage	9500 t/yr
	Maximum daily site tonnage	26000 kg/day
Frequency and duration of use	Continuous release	
	Emission days	365
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
	Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	Release fraction to air from wide dispersive use (regional only):	0.0001
	Release fraction to wastewater from wide dispersive use:	0.00001
	Release fraction to soil from wide dispersive use (regional only):	0.00001
Risk Management Measures		
Conditions and measures related to sewage treatment plant	Not applicable as there is no release to wastewater	
	Estimated substance removal from wastewater via municipal sewage treatment	94.6 %
	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	230000 kg/day
	Assumed domestic sewage treatment plant flow	2000 m³/d
Conditions and measures related to external treatment of waste for disposal	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations	
Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	ECETOC TRA consumer v3

3.2. Environment

Information for contributing exposure scenario	
2.2	Hydrocarbon Block Method (Petrorisk)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - 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. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation

4.2. Environment

Guidance - 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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)