SAFETY DATA SHEET

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

1.1. Product identifier

Name of the substance	Fuels, diesel
Identification number	649-224-00-6 (Index number)
Registration number	01-2119484664-27-XXXX
Synonyms	FOD, Heating oil, FOD winter, DML, Gas oil 0.5%s, Heating oils, GO fishing, GO export HTS, Diesel, Swiss diesel, Marine diesel, ULSD, Marine gas oil, Off-road diesel
Issue date	20-July-2020
Version number	04
Revision date	16-January-2023
Supersedes date	15-January-2023

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

Identified uses	Use as a fuel. A complete list of registered uses for this product can be found in the table of content of the exposure scenario for communication, available as an annex to the eSDS.
Uses advised against	All other uses.

1.3. Details of the supplier of the safety data sheet

Company name	Petroineos Manufacturing Scotland Ltd
Address	Bo'ness Road, Grangemouth Stirlingshire FK3 9XH United Kingdom
Telephone	+44-1324-493384
e-mail	msds.Olefins@ineos.com
Contact person	-

1.4. Emergency telephone number

3E Emergency Services	+44 20 35147487; 0800 680 0425 Access code: 335245: Available 24 hours a day, 7 days a week.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Fuels, diesel

Hazard pictograms

Signal word Danger

Hazard statements

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.

Precautionary statements

Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist/vapours.

Response

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P331 Do NOT induce vomiting.

Storage Not assigned.

Disposal Not assigned.

Supplemental information on the label None.

2.3. Other hazards Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.
This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.
Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Fuels, diesel	100	68334-30-5 269-822-7	01-2119484664-27-XXXX	649-224-00-6	

Classification: Flam. Liq. 3;H226, Acute Tox. 4;H332, Skin Irrit. 2;H315, Carc. 2;H351, STOT RE 2;H373, Asp. Tox. 1;H304, Aquatic Chronic 2;H411

Composition comments The full text for all H-statements is displayed in section 16. This product is registered under the REACH Regulation 1907/2006 as a UVCB. All concentrations are in percent by weight unless ingredient is a gas.
Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

SECTION 4: First aid measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a poison centre or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.

Ingestion Call a physician or poison control centre immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

4.2. Most important symptoms and effects, both acute and delayed Aspiration may cause pulmonary oedema and pneumonitis. Direct contact with eyes may cause temporary irritation. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.

4.3. Indication of any immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards Flammable liquid and vapour.

5.1. Extinguishing media

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture Vapours may form explosive mixtures with air. Vapours may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Special fire fighting procedures In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel Wear appropriate personal protective equipment.

For emergency responders Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use personal protection recommended in Section 8 of the SDS.

6.2. Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil etc) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labelled containers.

6.4. Reference to other sections For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist/vapours. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see section 10 of the SDS).

7.3. Specific end use(s) For detailed information, see section 1. Observe industrial sector guidance on best practices.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits No exposure limits noted for ingredient(s).

Biological limit values No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures Follow standard monitoring procedures.

Derived no effect levels (DNELs)

General population

Product	Value	Assessment factor	Notes
Fuels, diesel (CAS 68334-30-5)			
Long-term, Systemic, Dermal	1.3 mg/kg bw/day	40	
Long-term, Systemic, Inhalation	20 mg/m3	12.5	
Long-term, Systemic, Oral	1.3 mg/kg bw/day	40	
Short-term, Systemic, Inhalation	2600 mg/m3	12.5	

Workers

Product	Value	Assessment factor	Notes
Fuels, diesel (CAS 68334-30-5)			
Long-term, Systemic, Dermal	2.9 mg/kg bw/day	24	
Long-term, Systemic, Inhalation	68.3 mg/m3	7.5	Acute toxicity
Short-term, Systemic, Inhalation	4300 mg/m3	7.5	

Predicted no effect concentrations (PNECs) Not available.

8.2. Exposure controls

Appropriate engineering controls	Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

General information	Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
Eye/face protection	Chemical respirator with organic vapour cartridge and full facepiece. Eye protection should meet standard EN 166.
Skin protection	
- Hand protection	Viton® or nitrile rubber gloves are recommended. Wear suitable gloves tested to EN374. In full contact: Glove material: Nitrile rubber. Layer thickness: 0.225 mm. Breakthrough time: >480 min. Splash contact: Glove material: Neoprene; Layer thickness: 0.75 mm; Breakthrough time: 10-30 min.
- Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. In case of inadequate ventilation or risk of inhalation of oil mist, suitable respiratory equipment with combination filter (type A2/P2) can be used.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
Hygiene measures	Observe any medical surveillance requirements. When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.
Environmental exposure controls	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. Fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid.
Colour	Yellow.
Odour	Petroleum.
Odour threshold	Not determined.
pH	Not applicable.
Melting point/freezing point	> -40 - < 6 °C (> -40 - < 42.8 °F)
Initial boiling point and boiling range	> 141 - < 462 °C (> 285.8 - < 863.6 °F)
Flash point	> 56 °C (> 132.8 °F)
Evaporation rate	Not determined.
Flammability (solid, gas)	Flammable liquid and vapour.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not determined.
Explosive limit – upper (%)	Not determined.
Vapour pressure	0.4 kPa (40 °C (104 °F))
Vapour density	Not determined.
Relative density	Not determined.
Solubility(ies)	
Solubility (water)	Not applicable.
Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	>= 225 °C (>= 437 °F)
Decomposition temperature	Not determined.
Viscosity	>= 1.5 mm²/s

Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2. Other information

Density	Not determined.
Kinematic viscosity	>= 1.5 mm2/s (40 °C (104 °F))

SECTION 10: Stability and reactivity

10.1. Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Material is stable under normal conditions.
10.3. Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
10.4. Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
10.5. Incompatible materials	Strong oxidising agents.
10.6. Hazardous decomposition products	No hazardous decomposition products are known.

SECTION 11: Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation	Harmful if inhaled.
Skin contact	Causes skin irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms	Aspiration may cause pulmonary oedema and pneumonitis. Skin irritation. May cause redness and pain.

11.1. Information on toxicological effects

Acute toxicity	May be fatal if swallowed and enters airways. Harmful if inhaled.

Product	Species	Test Results
Fuels, diesel (CAS 68334-30-5)		
Acute		
Dermal		
LD50	Rabbit	> 4300 mg/kg bw/day
Inhalation		
LC50	Rat	4100 mg/m3
Oral		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory sensitisation	Based on available data, the classification criteria are not met.
Skin sensitisation	Based on available data, the classification criteria are not met.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Suspected of causing cancer.
Reproductive toxicity	Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.
Specific target organ toxicity - repeated exposure	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	May be fatal if swallowed and enters airways.
Mixture versus substance information	No information available.
Other information	May be absorbed through the skin.

SECTION 12: Ecological information

12.1. Toxicity Toxic to aquatic life with long lasting effects.

Product		Species	Test Results
Fuels, diesel (CAS 68334-30-5)			
Aquatic			
Acute			
Crustacea	EL50	Daphnia	68 mg/l, 48 hours
Fish	LL50	Freshwater fish	21 mg/l, 96 hours

12.2. Persistence and degradability Expected to be inherently biodegradable.

12.3. Bioaccumulative potential The product is not bioaccumulating.

Partition coefficient n-octanol/water (log Kow) Not available.

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil No data available.

12.5. Results of PBT and vPvB assessment This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

12.6. Other adverse effects Oil spills are generally hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste Dispose in accordance with local regulations. Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

EU waste code The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Disposal methods/information Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Special precautions Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number UN1202

14.2. UN proper shipping name DIESEL FUEL

14.3. Transport hazard class(es)

Class 3

Subsidiary risk -

Label(s) 3

Hazard No. (ADR) 30

Tunnel restriction code D/E

14.4. Packing group III

14.5. Environmental hazards Yes

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number UN1202

14.2. UN proper shipping name DIESEL FUEL

14.3. Transport hazard class(es)

Class 3

Subsidiary risk -

Label(s) 3

14.4. Packing group III

14.5. Environmental hazards Yes

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN1202
14.2. UN proper shipping name	DIESEL FUEL
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
14.4. Packing group	III
14.5. Environmental hazards	Yes
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number	UN1202
14.2. UN proper shipping name	DIESEL FUEL
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
14.4. Packing group	III
14.5. Environmental hazards	Yes
ERG Code	3L
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

14.1. UN number	UN1202
14.2. UN proper shipping name	DIESEL FUEL
14.3. Transport hazard class(es)	
Class	3
Subsidiary risk	-
14.4. Packing group	III
14.5. Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.
General information	IMDG Regulated Marine Pollutant.

SECTION 15: Regulatory information

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

Retained direct EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EU) 2019/1021 On persistent organic pollutants (recast), as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Fuels, diesel (CAS 68334-30-5)

Other regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances: Part 2 (Named dangerous substances) - 34. Petroleum products and alternative fuels. This product is classified and labelled in accordance with the retained CLP Regulation (EC) No 1272/2008, as amended for Great Britain. This Safety Data Sheet is compiled in accordance with REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758.

New or expectant mothers should not work with this product if there is a risk due to exposure, in accordance with the Management of Health and Safety at Work Regulations 1999 [SI 1999/3242], as amended. Follow the requirements of the Control of Substances Hazardous to Health Regulations 2002 [SI 2002/2677], as amended, when using this material.

15.2. Chemical safety assessment Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

ADN: European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways.
ADR: Agreement concerning the International Carriage of Dangerous Goods by Road.
CAS: Chemical Abstract Service.
CEN: European Committee for Standardization.
EL50: Effective level, 50%.
IATA: International Air Transport Association.
IBC Code: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
IMDG: International Maritime Dangerous Goods.
LC50: Lethal Concentration, 50%.
LD50: Lethal Dose, 50%.
LL50: Lethal level, 50%.
PBT: Persistent, bioaccumulative and toxic.
MARPOL: International Convention for the Prevention of Pollution from Ships.
PBT: Persistent, bioaccumulative and toxic.
vPvB: Very Persistent and very Bioaccumulative.
RID: Regulations concerning the International Carriage of Dangerous Goods by Rail.
vPvB: Very persistent and very bioaccumulative.

References Chemical safety report.

Information on evaluation method leading to the classification of mixture Not applicable.

Full text of any statements, which are not written out in full under sections 2 to 15

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.

Training information Follow training instructions when handling this material.

Disclaimer Petroineos Manufacturing Scotland Ltd cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Annex to the extended Safety Data Sheet (eSDS)

Table of contents

1 - Exposure Scenario Worker

1. Manufacture of substance

List of use descriptors

Sector(s) of Use	Manufacture of substance
Name of contributing environmental scenario and corresponding ERC	ERC1: Manufacture of the substance
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Manufacture of the substance

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region:	0.1
Regional use tonnage	26000000 tonnes/year
Fraction of regional tonnage used locally	0.73
Annual site tonnage	19000000 tonnes/year
Maximum daily site tonnage	62000000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.01	0.0001	0.000029	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 99.8. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 92.1.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant

Discharge rate	10000 m3/day
Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 6.2e7 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	99.8 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	During manufacturing no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

Suitable recover operations	During manufacturing no waste of the substance is generated.

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Bulk closed loading and unloading: Handle substance within a closed system. Bulk product storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Process sampling: No other specific measures identified. Laboratory activities: No other specific measures identified.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

Conditions and measures related to personal protection, hygiene and health evaluations	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 exposures (open systems): Wear suitable gloves tested to EN374. Bulk closed loading and unloading: Wear suitable gloves tested to EN374. Bulk open loading and unloading: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

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. Risk Management Measures are based on qualitative risk characterisation.

2 - Exposure Scenario Worker

1. Formulation & (re)packing of substances and mixtures

List of use descriptors

Sector(s) of Use	SU10: Formulation [mixing] of preparations and/or re-packaging
Name of contributing environmental scenario and corresponding ERC	ERC2: Formulation into mixture
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC14: Tabletting, compression, extrusion, pelettisation, granulation PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Formulation into mixture

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	30000000 tonnes/year
Fraction of regional tonnage used locally	0.001
Annual site tonnage	30000 tonnes/year
Maximum daily site tonnage	100000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

Emission days		Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.01	0.0001	0.00012	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 0
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 94.4. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	20000 m³/day
Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.1e5 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.9 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Batch processes at elevated temperatures: Provide extract ventilation to points where emissions occur. Drum/batch transfers: Use drum pumps or carefully pour from container. Bulk transfers: Handle substance within a closed system. Mixing operations (open systems): Provide extract ventilation to points where emissions occur. Laboratory activities: No other specific measures identified. Process sampling: No other specific measures identified.

Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluations	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 exposures (open systems): Wear suitable gloves tested to EN374. Drum/batch transfers: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Bulk transfers: Wear suitable gloves tested to EN374. Production of preparations or articles by tabletting, compression, extrusion, pelettisation: Wear suitable gloves tested to EN374. Drum and small package filling: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Mixing operations (open systems): Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

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

3 - Exposure Scenario Worker

1. Use as an intermediate

List of use descriptors

Sector(s) of Use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Name of contributing environmental scenario and corresponding ERC	ERC6a: Use of intermediate
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Use of intermediate

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	1000000 tonnes/year
Fraction of regional tonnage used locally	0.015
Annual site tonnage	15000 tonnes/year
Maximum daily site tonnage	50000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other factors	Estimated substance removal from wastewater via domestic sewage treatment (%): 94.9

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.001	0.001	0.0003	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 80
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 94.4. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m³/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.0e4 kg/d

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	This substance is consumed during use and no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment effectiveness	95.6

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Process sampling: No other specific measures identified. General exposures (closed systems): Handle substance within a closed system. Bulk closed loading and unloading: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities: No other specific measures identified. Bulk product storage: Store substance within a closed system.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

Conditions and measures related to personal protection, hygiene and health evaluations	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 exposures (open systems): Wear suitable gloves tested to EN374. Bulk closed loading and unloading: Wear suitable gloves tested to EN374. Bulk open loading and unloading: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for 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 - Exposure Scenario Worker

1. Distribution of substance

List of use descriptors

Sector(s) of Use	Distribution of substance
Name of contributing environmental scenario and corresponding ERC	ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC5: Use at industrial site leading to inclusion into/onto article ERC6a: Use of intermediate ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC6c: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) ERC6d: Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent

2.1.1. Contributing scenario controlling environmental exposure for Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	31000000 tonnes/year
Fraction of regional tonnage used locally	0.002
Annual site tonnage	61000 tonnes/year
Maximum daily site tonnage	200000 kg/day

Frequency and duration of use

Continuous process	300 days/year

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.001	0.00001	0.00001	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 74.3. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0

Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment. No wastewater treatment required.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m³/day
Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.0e6 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.9 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	94.9

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Storage: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities: No other specific measures identified. Bulk closed loading and unloading: Handle substance within a closed system. Process sampling: No other specific measures identified.

Organizational measures to prevent/limit releases, dispersion and exposure	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluations	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 exposures (open systems): Wear suitable gloves tested to EN374. Bulk closed loading and unloading: Wear suitable gloves tested to EN374. Bulk open loading and unloading: Wear suitable gloves tested to EN374. Drum and small package filling: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

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

5 - Exposure Scenario Worker

1. Use in Oil and Gas field drilling and production operations

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding ERC	ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities

2.1.1. Contributing scenario controlling environmental exposure for Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	1
Regional use tonnage	20000 tonnes/year

Frequency and duration of use

Continuous process	Continuous

Environment factors not influenced by risk management

Local freshwater dilution factor:	Not available.
Local marine water dilution factor:	Not available.

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
Not applicable.				0.000001	

Risk management measures (RMM)

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

Air	Not available.
Soil	Not available.
Water	Not available.
Sediment	Not available.
Organisational measures to prevent/limit release from site	Prevent environmental discharge consistent with regulatory requirements.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Municipal Sewage Treatment Plant
Discharge rate	Not available.
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid.
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Other relevant operational conditions

Assumes a good basic standard of occupational hygiene is implemented

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Bulk transfers: Transfer via enclosed lines. Drilling mud (re-)formulation: No other specific measures identified. Operation of solids filtering equipment: Provide the operation with a properly sited receiving hood. Cuttings treatment and disposal: Provide extract ventilation to points where emissions occur. Sample collection: No other specific measures identified.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

Conditions and measures related to personal protection, hygiene and health evaluations	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. Filling / preparation of equipment from drums or containers: Wear suitable gloves tested to EN374. Drill floor operations: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Cleaning of solids filtering equipment: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. General exposures (open systems): Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Pouring from small containers: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.

Health

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

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

Environment

Offshore drilling: 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.

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. Risk Management Measures are based on qualitative risk characterisation.

1. Use as a fuel, Industrial

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding ERC	ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC16: Use of fuels

2.1.1. Contributing scenario controlling environmental exposure for Use of functional fluid at industrial site

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	3700000 tonnes/year
Fraction of regional tonnage used locally	0.4
Annual site tonnage	1500000 tonnes/year
Maximum daily site tonnage	5000000 kg/day

Frequency and duration of use

Continuous process	Emission days (days/year): 100

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	100	0.005	0	0.0000024	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 95
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 94.4. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0.
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Risk from environmental exposure is driven by freshwater sediment.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m³/day

Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.5e6 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.9 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	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.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as a fuel (closed systems): No other specific measures identified. Storage: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Not available.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

Conditions and measures related to personal protection, hygiene and health evaluations	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. Bulk transfers: Wear suitable gloves tested to EN374. Drum/batch transfers: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

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

7 - Exposure Scenario Worker

1. Functional Fluids, Industrial.

List of use descriptors

Sector(s) of Use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding ERC	ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

2.1.1. Contributing scenario controlling environmental exposure for Use of functional fluid at industrial site

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	1500 tonnes/year
Fraction of regional tonnage used locally	0.0069
Annual site tonnage	10 tonnes/year
Maximum daily site tonnage	500 kg/day

Frequency and duration of use

Continuous process	Emission days (days/year): 20

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	20	0.005	0.001	0.00003	

Risk management measures (RMM)

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

Air	Treat air emission to provide a typical removal efficiency of (%): 0
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 29.7. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	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.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m³/day
Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 7.0e3 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.9 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Filling of articles/equipment (closed systems): Transfer via enclosed lines. Equipment operation (closed systems): No other specific measures identified. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Bulk transfers: No other specific measures identified. Equipment operations (open systems): Restrict area of openings and provide extract ventilation to emission points when substance handed at elevated temperatures.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

Conditions and measures related to personal protection, hygiene and health evaluations	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. Drum/batch transfers: Wear suitable gloves tested to EN374. Re-work and re-manufacture of articles: Wear suitable gloves tested to EN374. Filling of equipment from drums or containers: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

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. Risk Management Measures are based on qualitative risk characterisation.

8 - Exposure Scenario Worker

1. Use as a fuel, Professional

List of use descriptors

Sector(s) of Use	SU22: Professional uses
Name of contributing environmental scenario and corresponding ERC	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding PROCs	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC16: Use of fuels

2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid. Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	6900000 tonnes/year
Fraction of regional tonnage used locally	0.0005
Annual site tonnage	3400 tonnes/year
Maximum daily site tonnage	9400 kg/day

Frequency and duration of use

Continuous process	Emission days (days/year): 365

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days		Emission factors		
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	365	0.001	0.00001	0.00001	

Risk management measures (RMM)

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

Air	Not applicable.
Soil	Not applicable.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): 34.3. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%): 0
Sediment	Not applicable.
Organisational measures to prevent/limit release from site	Not available.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m³/day

Treatment effectiveness	94.9 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.2e5 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.9 %

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	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.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.
Remarks	Not applicable.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Amounts used

Covers percentage substance in the product up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours

Human factors not influenced by risk management

Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as a fuel (closed systems): Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Drum/batch transfers: Use drum pumps or carefully pour from container.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

Conditions and measures related to personal protection, hygiene and health evaluations	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. Bulk transfers: Wear suitable gloves tested to EN374. Drum/batch transfers: Wear suitable gloves tested to EN374. Refuelling: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure Estimation

Environment

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

Health

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

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

Environment

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

Health

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

9 - Exposure Scenario Consumer

1. Use as a fuel

List of use descriptors

Sector(s) of Use	SU21: Consumer uses
Name of contributing environmental scenario and corresponding ERC	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing consumer scenarios and corresponding PROCs	PC13: Fuels

2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Substance is complex UVCB. Predominantly hydrophobic

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage	19000000 tonnes/year
Fraction of regional tonnage used locally	0.0005
Annual site tonnage	9600 tonnes/year
Maximum daily site tonnage	26000 kg/day

Frequency and duration of use

Batch process	Not applicable.
Continuous process	Emission days (days/year): 365

Environment factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Remarks**
initial release prior to RMM	300	0.001	0.00001	0.00001	

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Not available.

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/treatment plant (m3/d)

Type	No wastewater treatment required.
Discharge rate	2000 m³/day
Treatment effectiveness	94.9 %
Sludge treatment technique	Not available.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 3.0e5 kg/d

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment

Suitable waste treatment	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.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.
Remarks	Not applicable.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment

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

2.2.1. Contributing exposure scenario controlling consumer exposure for Fuels

Product characteristics

Physical form of the product Liquid.

vapour pressure Liquid, vapour pressure > 10 Pa at Standard Temperature and Pressure

Process temperature Assumes activities are at ambient temperature (unless stated differently).

Amounts used

Liquid: automotive refuelling < 37500 g Covers percentage substance in the product up to 100 %.

Liquid: home space heater fuel < 1500 g Covers percentage substance in the product up to 100 %.

Liquid: garden equipment - use < 750 g Covers percentage substance in the product up to 100 %.

Liquid: garden equipment - refuelling < 750 g Covers percentage substance in the product up to 100 %.

Frequency and duration of use

	Duration	Frequency of use	Remarks
Liquid: automotive refuelling	< 0.05	52 days per year	(Duration unit = hour)
Liquid: scooter refuelling	< 0.03	120 days per year	(Duration unit = hour)
Liquid: garden equipment - use	< 2	26 days per year	(Duration unit = hour)
Liquid: garden equipment - refuelling	< 0.03	26 days per year	(Duration unit = hour)

Human factors not influenced by risk management

Exposed skin areas Liquid: automotive refuelling Covers skin contact area up to 210 cm2
Liquid: home space heater fuel Covers skin contact area up to 210 cm2
Liquid: garden equipment - refuelling Covers skin contact area up to 420 cm2

Other given operational conditions affecting consumer exposure

Area of use	Room size	Temperature	Ventilation rate	Remarks
Liquid: automotive refuelling	100 m³			Outdoor use
Liquid: home space heater fuel	20 m³			Indoor use
Liquid: garden equipment - use	100 m³			Outdoor use
Liquid: garden equipment - refuelling	34 m³			Indoor use

Other relevant operational conditions

Not available.

Risk management measures (RMM)

Conditions and measures related to information and behavioral advice to consumers

Not available.

Conditions and measures related to personal protection, hygiene and health evaluations No specific risk management measure identified beyond those operational conditions stated.

3. Exposure Estimation

Environment

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

Health

The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC report #107 and the chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these source, then they are indicated.

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

Environment

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

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.