SAFETY DATA SHEET

ULSD 10 ppm - diesel B0

Document: DE-SDS-ULSD-10PPM-B0 | Revision 1.1 | 20 March 2026 | English
Technical source: Burgas SDS 901343 v02 (28 December 2022).

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

1.1. Product identifier

Substance name	Fuels, diesel
Trade name of the substance	Diesel fuel; diesel fuel for export; diesel fuel (cloud point minus 10 C); fuel for non-road machinery and tractors; diesel
Identification number	649-224-00-6 (Index No.)
Registration number	01-2119484664-27-0090
Synonyms	None.

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

Identified uses	Use as fuel. The full list of registered uses for this product is in the table of contents of the exposure scenarios for communication, annexed to this extended SDS.
Uses advised against	Use in accordance with supplier recommendations.

1.3. Details of the supplier of the safety data sheet

Supplier / distributor: Drakensberg Energy Europe EOOD | UIC 208760847
1st office, 5th floor, 9–11 Knyaginya Maria Luisa Blvd.
Vazrazhdane, 1000 Sofia, Bulgaria
Business telephone: +27 82 902 0083
SDS contact: gonnie@drakensbergenergy.com
Manufacturer: LUKOIL Neftohim Burgas AD, Burgas 8104, Bulgaria

1.4. Emergency telephone numbers
Bulgaria / EU emergency services: 112 (24 hours).
National Toxicology Centre, N. I. Pirogov, Sofia: +359 2 9154 233.
At destination, also contact the local emergency / poison service and activate the client site or vessel emergency response plan. Give this SDS to responders.
The business mobile above is not a medical emergency advisory service.

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

Physical hazards		
Flammable liquids	Category 3	H226 - Flammable liquid and vapour.
Health hazards		
Acute toxicity, inhalation	Category 4	H332 - Harmful if inhaled.
Skin corrosion/irritation	Category 2	H315 - Causes skin irritation.
Carcinogenicity	Category 2	H351 - Suspected of causing cancer.
Specific target organ toxicity - repeated exposure	Category 2 (bone marrow, thymus, liver)	H373 - May cause damage to organs (bone marrow, thymus, liver) through prolonged or repeated exposure.
Aspiration hazard	Category 1	H304 - May be fatal if swallowed and enters airways.
Environmental hazards		
Hazardous to the aquatic environment, long-term aquatic hazard	Category 2	H411 - Toxic to aquatic life with long lasting effects.

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2.2. Label elements

Labelling 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 (bone marrow, thymus, liver) through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

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

Storage

P403 + P235	Store in a well-ventilated place. Keep cool.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information None.

2.3. Other hazards

Static-accumulating flammable liquid.
Hydrogen sulphide (H2S) may accumulate in the headspace of storage containers and reach potentially hazardous concentrations.
This substance does not meet the vPvB (very persistent and very bioaccumulative) or PBT (persistent, bioaccumulative and toxic) criteria of Regulation (EC) No 1907/2006, Annex XIII.
The substance is not included in the list established under REACH Article 59(1) for having endocrine-disrupting properties.
The substance is not considered to have endocrine-disrupting properties under the criteria of Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 3. Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS number / EC number	Registration number under REACH	Index No.	Notes
Fuels, diesel	100	68334-30-5 269-822-7	01-2119484664-27-0090	649-224-00-6	

Classification: Flam. Liq. 3;H226, Acute Tox. 4;H332;(ATE: 11 mg/l), Skin Irrit. 2;H315, Carc. 2;H351, STOT RE 2;H373, Asp. Tox. 1;H304, Aquatic Chronic 2;H411

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Composition comments

This product is registered under REACH Regulation 1907/2006 as a UVCB.
The full text of all hazard statements is given in Section 16.
All concentrations are in percent by weight unless the ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4. First aid measures

General information

Get medical attention if you feel unwell.

4.1. Description of first aid measures

Inhalation

Move to fresh air. Give oxygen if breathing is difficult. Get medical attention if discomfort occurs or persists.

If H2S inhalation is suspected:
Rescuers must wear breathing apparatus, a harness and safety line, and follow rescue procedures.
Move the casualty to fresh air as quickly as possible.
Immediately give artificial respiration if breathing has stopped.
Oxygen may help.
Seek medical attention for further treatment.

Skin contact

Remove contaminated clothing. Wash with soap and water. In case of rashes, wounds or other skin disorders, seek medical attention and show these instructions.

Eye contact

Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses, if present, and hold eyelids apart. Seek medical attention if irritation develops or persists.

Ingestion

Rinse the mouth. Do not induce vomiting or give anything to drink. Obtain immediate medical or poison-centre advice and arrange urgent medical assessment. Keep the casualty under observation. If vomiting occurs, keep the head low to reduce aspiration risk. Never give anything by mouth to an unconscious person. Take this SDS to the medical team.

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

Irritation of eyes and mucous membranes. Skin irritation. Defatting of the skin. Dermatitis. Ingestion may cause irritation and discomfort.

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

Treat symptomatically. Effects may be delayed.

SECTION 5. Firefighting measures

General fire hazards

The product is flammable and heating may generate vapours that can form explosive vapour/air mixtures. The material will float on water and may reignite.

5.1. Extinguishing media

Suitable extinguishing media

Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media

Do not use water jets, as these will spread the fire.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition may produce smoke, carbon oxides and lower-molecular-weight organic compounds of unspecified composition. Sulphur oxides (SOx). Nitrogen oxides (NOx).

5.3. Advice for firefighters

Special protective equipment for firefighters

Self-contained breathing apparatus and full protective equipment must be worn in a fire.

Special firefighting procedures

Move containers from the fire area if this can be done without risk. Use water spray to cool unopened containers. Cool containers with flooding quantities of water long after the fire is extinguished.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep upwind. Eliminate all ignition sources (no smoking, flares, sparks or flames in the immediate area). Avoid skin contact. Wear suitable protective clothing, gloves and eye/face protection. For personal protection see Section 8 of this SDS. In the event of a spill, beware of slippery floors and surfaces.

For emergency responders

Use personal protective equipment as recommended in Section 8 of the SDS.

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6.2. Environmental precautions

Prevent spreading over a wide area, for example by containment or bunding. Do not contaminate water. Contact local authorities in the event of a release to drains or the aquatic environment.

6.3. Methods and material for containment and cleaning up

Stop the flow of material if this can be done without risk. Bund spilled material where possible.

Large spills: Transfer with vacuum trucks or a pump to storage/recovery containers. Use non-combustible material such as vermiculite, sand or earth to absorb the product and place in a container for later disposal. Wash the area with soap and water. Collect and remove waste and contaminated materials from the work area in a suitably labelled container as soon as possible.

Small spills: Absorb with a non-combustible absorbent material.

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

Before entering storage tanks and starting work in confined spaces, test the atmosphere for oxygen content and flammability, as applicable. If sulphur compounds are suspected in the product, test the atmosphere for H2S. Restrict access to the work area to those handling the product. Use closed systems where possible. Avoid contact with eyes, skin and clothing. Avoid breathing vapours. Wear appropriate personal protective equipment. Take precautions against static electricity. Ground/bond containers and transfer equipment to eliminate electrostatic sparks. Vapours are heavier than air and may spread along floors and the bottom of containers. Change contaminated clothing immediately. Do not eat, drink or smoke when using this product. Caution: surfaces may become slippery. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities

Follow regulations for flammable liquids. Keep away from heat, sparks and open flame. Store in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Store away from incompatible materials.

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

ANNEX I, PART 2 Named dangerous substances
- 34. Petroleum products and alternative fuels (lower-tier requirements = 2,500 tonnes; upper-tier requirements = 25,000 tonnes)

7.3. Specific end use(s)

Follow industry best-practice guidance.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Agent / reference	8-hour TWA	15-minute STEL / note
Hydrogen sulphide, CAS 7783-06-4	7 mg/m³ / 5 ppm	14 mg/m³ / 10 ppm

Statutory chemical-agent entries: Bulgarian Ordinance No 13, consolidated 2026 edition. Benzene: Bulgarian Ordinance No 10 and Directive (EU) 2022/431. The refinery DNELs/PNECs and other protective measures remain in Section 8 and the exposure annexes. An exposure limit is not a boundary between safe and harmful exposure. Control inhalation and skin contact and use the lower applicable risk-management value.

Hydrogen sulphide may accumulate in tank headspaces. Monitor the atmosphere before entry or opening. Odour is not a reliable warning. Air-purifying filters are unsuitable for oxygen-deficient atmospheres or uncontrolled H_2S concentrations; trained responders require suitable supplied-air protection.

Biological limit values

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

Recommended monitoring procedures

Follow standard monitoring procedures.

Derived no-effect levels (DNELs)

Workers

Product	Value	Assessment factor	Notes
Fuels, diesel (CAS 68334-30-5)			
Long-term, systemic, dermal	2.9 mg/kg body weight/day		

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Long-term, systemic, inhalation	68.3 mg/m3

Predicted no-effect concentrations (PNECs)

Product	Value	Assessment factor	Notes
Fuels, diesel (CAS 68334-30-5)			
Fresh water	21 µg/l		

8.2. Exposure controls

Appropriate engineering controls Provide adequate ventilation and minimise the risk of inhalation of vapours and oil mist. Use explosion-proof equipment. Ensure easy access to water and eyewash facilities.

Individual protection measures, such as personal protective equipment

General information Use prescribed personal protective equipment. Store work clothing separately. Select personal protective equipment according to CEN standards and in discussion with the PPE supplier.

Eye/face protection Wear safety glasses with side shields (or goggles) according to EN 166.

Skin protection

- Hand protection Wear suitable gloves tested according to EN 374. Nitrile gloves are recommended. Be aware that liquid may penetrate gloves; frequent changes are recommended. The glove supplier can advise on suitable gloves.

- Other Wear protective overalls. Antistatic, flame-retardant protective clothing is recommended.

Respiratory protection If ventilation is insufficient or there is a risk of inhaling oil mist, use a suitable respirator with a combination filter (A2/P2). If ventilation is insufficient or there is a risk of inhaling oil mist, a suitable respirator with a combination filter and organic vapour protection may be used. Wear an air-supplied mask in confined spaces. Seek advice from the local supervisor.

Thermal hazards Wear appropriate thermal protective clothing when necessary.

Hygiene measures Do not eat, drink or smoke when handling. Wash hands after handling. Wash contaminated clothing before reuse. Keep personal clothing separate from work clothing. Handle in accordance with good industrial hygiene and safety practice. Observe all medical-surveillance requirements.

Environmental exposure controls Check emissions from ventilation or work-process equipment to ensure compliance with environmental protection legislation. Fume scrubbers, filters or engineering modifications to process equipment may be needed to reduce emissions to acceptable levels.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state Liquid.

Form Liquid.

Colour Dark amber.

Odour Characteristic.

Melting point/freezing point > -40 - < 6 °C (> -40 - < 42,8 °F)

Boiling point or initial boiling point and boiling range > 141 - < 462 °C (> 285,8 - < 863,6 °F)

Flammability Flammable liquid and vapour.

Upper/lower flammability or explosive limits

Lower flammability limit (%) Not determined.

Upper flammability limit (%) Not determined.

Flash point > 56 C (> 132.8 F)

Auto-ignition temperature ≥225°C

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Decomposition temperature	Not determined.
pH	Not applicable.
Kinematic viscosity	4.15 mm2/s (40 C (104 F))
Solubility	
Solubility (water)	Insoluble in water.
Partition coefficient (n-octanol/water) (log value)	Not applicable.
Vapour pressure	Not determined.
Density and/or relative density	
Density	> 0.8 - < 0.91 g/cm3
Vapour density	Not determined.
Particle characteristics	Not applicable; the material is a liquid.
9.2. Other information	
9.2.1. Information with regard to physical hazard classes	No relevant additional information.
9.2.2. Other safety characteristics	No relevant additional information.

SECTION 10. Stability and reactivity

10.1. Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Stable under normal conditions.
10.3. Possibility of hazardous reactions	Hazardous polymerisation does not occur. No hazardous reactions occur.
10.4. Conditions to avoid	Heat, sparks, flames and high temperatures. Contact with incompatible materials.
10.5. Incompatible materials	Strong acids. Strong oxidising agents.
10.6. Hazardous decomposition products	Thermal decomposition or combustion may release carbon oxides and other toxic gases or vapours.

SECTION 11. Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.
Information on likely routes of exposure	
Inhalation	Inhalation of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of coordination. Prolonged inhalation may cause unconsciousness.
Skin contact	Causes skin irritation. Repeated exposure may cause skin dryness or cracking. May be absorbed through the skin.
Eye contact	Direct contact may cause eye irritation.
Ingestion	Ingestion may cause irritation and discomfort.
Symptoms	Irritation of eyes and mucous membranes. Skin irritation. Defatting of the skin. Dermatitis. Ingestion may cause irritation and discomfort.

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity	Harmful if swallowed: may enter the lungs if swallowed or vomited. Inhalation of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of coordination. Prolonged inhalation may cause unconsciousness. May cause irritation, stomach pain, vomiting, diarrhoea and nausea.

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Product	Species	Test results
Fuels, diesel (CAS 68334-30-5)		
Acute		
Inhalation		
Vapour		
LC50	Rat	4.1 mg/l, 4 hours
Dermal		
LD50	Rabbit	> 5000 mg/kg
Oral		
LD50	Rat	9 ml/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Direct contact may cause eye 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 cancer hazard.

Reproductive toxicity Based on available data, the classification criteria are not met.

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 the following organs through prolonged or repeated exposure: liver, bone marrow, thymus.

Aspiration hazard Droplets of the product aspirated into the lungs through ingestion or vomiting may cause serious chemical pneumonia.

Mixture versus substance information Not available.

11.2. Information on other hazards

Endocrine-disrupting properties This substance has no endocrine-disrupting properties with respect to human health, as it does not meet the assessment criteria in Regulations (EC) No 1907/2006, (EU) 2017/2100 and (EU) 2018/605.

Other information Product ingredients may enter the body 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			
Algae	EL50	Freshwater algae	22 mg/l, 72 hours
Crustacea	EL50	Water flea	68 mg/l, 48 hours
Fish	LL50	Freshwater fish	21 mg/l, 96 hours

12.2. Persistence and degradability Expected to be readily degradable.

12.3. Bioaccumulative potential Assessment of representative hydrocarbons indicates that no structures meet the very bioaccumulative (vB) criterion. Some, however, meet the bioaccumulative (B) criterion. Bioaccumulation potential is low.

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

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil Based on the calculation model, the product has the potential to adsorb to soil.

Mobility in general The product is insoluble in water and will spread on the water surface, although some components will eventually settle in aquatic systems. Volatile components will disperse into the atmosphere.

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12.5. Results of PBT and vPvB assessment	This substance does not meet the vPvB (very persistent and very bioaccumulative) or PBT (persistent, bioaccumulative and toxic) criteria of Regulation (EC) No 1907/2006, Annex XIII.
12.6. Endocrine-disrupting properties	This substance has no endocrine-disrupting properties with respect to the environment, as it does not meet the assessment criteria in Regulations (EC) No 1907/2006, (EU) 2017/2100 and (EU) 2018/605.
12.7. Other adverse effects	The product contains volatile organic compounds with the potential to form photochemical ozone. Oil spills are generally hazardous to the environment.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local requirements.
Contaminated packaging	Empty containers may retain product residue; follow label warnings even after a container has been emptied.
EU waste code	Assign waste codes in consultation between the user, producer and waste-disposal companies.
Disposal methods/information	Dispose of in accordance with all applicable regulations. This material and its container must be treated as hazardous waste.

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
ADR hazard identification number	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 use.

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 use.

ADN

14.1. UN number	UN1202
14.2. UN proper shipping name	DIESEL FUEL

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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 use.

IATA

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
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	-
Label(s)	3
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. Maritime transport in bulk according to IMO instruments	This product is considered to fall within the scope of MARPOL 73/78 Annex I and is subject to its requirements when carried in bulk.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations specific to the product
This supplier edition uses the REACH Regulation (EC) No 1907/2006, Annex II as amended by Regulation (EU) 2020/878, and the CLP Regulation (EC) No 1272/2008, as amended. Classification and composition are retained from the identified refinery SDS.

Bulgaria: apply Ordinance No 13 on protection against chemical agents at work, and Ordinance No 10 on carcinogens, mutagens and reprotoxic substances, as amended. The occupational limits and control references used in this edition appear in Section 8.1 and its continuation. Apply workplace risk assessment, exposure minimisation, appropriate medical surveillance and relevant national waste and environmental rules.

Observe national provisions implementing Directive 94/33/EC for young workers and Directive 92/85/EEC for pregnant, recently delivered or breastfeeding workers, including the required workplace risk assessment and restrictions.

Major-accident control: the petroleum-products provisions in Annex I, Part 2 of Directive 2012/18/EU (Seveso III) are relevant. Site obligations depend on the inventory and the applicable aggregation rules.

Transport instruments for road and sea carriage are identified in Section 14. This English edition accompanies international trade; a Bulgarian-language SDS is required for supply on the Bulgarian market.

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15.2. Chemical safety assessment

The refinery source states that a chemical safety assessment has been carried out for the substance.

SECTION 16. Other information

List of abbreviations

PBT: persistent, bioaccumulative and toxic.
vPvB: very persistent and very bioaccumulative.
CEN: European Committee for Standardization.
LD50: lethal dose, 50%.
LC50: lethal concentration, 50%.
LL50: lethal loading, 50%.
EL50: effective loading, 50%.
ADR: Agreement concerning the International Carriage of Dangerous Goods by Road.
RID: Regulations concerning the International Carriage of Dangerous Goods by Rail.
ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
IATA: International Air Transport Association.
IMDG: International Maritime Dangerous Goods Code.
MARPOL: International Convention for the Prevention of Pollution from Ships.
IBC Code: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
UVCB: substances of unknown or variable composition, complex reaction products or biological materials.
Chemical Safety Report.
IARC Monographs: Overall Evaluation of Carcinogenicity.

References

CLP files: http://concawe.org/

Information on the evaluation method leading to classification of the mixture

Classification for health and environmental hazards is derived from a combination of calculation methods and test data, where available.

Full text of statements not written out in full in Sections 2-15

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.
1, 2, 3, 7, 8, 9, 11, 12, 14, 15, 16.

This SDS contains revisions in the following section(s):

Training information

Follow training instructions when handling this material.

This information concerns the identified product and its safe handling. Product-source attribution and the supplier revision record appear in Section 16.

Document control

Supplier edition 1.1 | 20 March 2026 | English | Bulgaria

Product scope. Diesel without a listed biodiesel component; CAS 68334-30-5; refinery REACH registration 01-2119484664-27-0090. This document applies to the identified B0 product.

Technical source. LUKOIL Neftohim Burgas AD, SDS 901343, version 02, 28 December 2022. Refinery source. The complete Bulgarian diesel source and all exposure scenarios have been translated into English.

Changes in this supplier edition. EU supplier and emergency contacts; English document control and product identification; Bulgarian exposure-limit references and national regulatory information; ingestion first-aid wording aligned with chemical-emergency guidance. Classification and composition are unchanged.

Emergency reference: Bulgarian Ministry of Environment and Water. Workplace limits: Ordinance No 13; Ordinance No 10. First aid: CDC chemical-emergency guidance.

The SDS describes health, safety and environmental precautions for the identified product. It is not a batch quality certificate. Read it together with the applicable cargo documents and exposure-scenario conditions.

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

List of use descriptors

Sector(s) of use	SU10: Formulation [mixing] of preparations and/or repackaging
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC2: Formulation into mixture
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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, pelletisation, granulation PROC15: Use as laboratory reagent

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2.1.1. Contributing exposure scenario controlling environmental exposure for Formulation into mixture

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	3 e7
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

Batch process	Not applicable.
Continuous process	300 days/year

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.01	0.0001	0.0002	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 0
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 96.7%. If discharged to a municipal sewage treatment plant, provide required on-site wastewater removal efficiency of >= 31.5%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a domestic sewage treatment plant, no on-site wastewater treatment is required.

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Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	20000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 1.0e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	96,7
Notes	Not applicable.

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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.
Technical conditions and measures to control dispersion from source to worker	Batch process at elevated temperatures: Provide additional ventilation at emission points. Drum/batch transfers: Use drum pumps or pour carefully from the container. Bulk transfers: Handle substance within a closed system. Mixing operations (open systems): Provide additional ventilation at emission points. Laboratory activities: No other specific measures identified.

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	Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Bulk transfers: Wear suitable gloves tested to EN 374. Production of preparations or articles by tabletting, compression, extrusion and pelletisation: Wear suitable gloves tested to EN 374. Drum and small-pack filling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Mixing operations (open systems): Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

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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 environmental release category (ERC)	ERC6a: Use of intermediate
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Use of intermediate

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the 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

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.001	0.001	0.0003	

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Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 80
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 94.4%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a domestic sewage treatment plant, no on-site wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 5.0e4 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	This substance is consumed during use and no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment efficiency	95,6

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

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

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

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Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operations are 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. Closed bulk loading and unloading: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source to worker	Laboratory activities: No other specific measures identified. Bulk product storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Closed bulk loading and unloading: Wear suitable gloves tested to EN 374. Open bulk loading and unloading: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

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Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Distribution of substance

List of use descriptors

Sector(s) of use	Distribution of substance
Name of contributing environmental scenario and corresponding environmental release category (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 (with or without inclusion into/onto article) ERC6d: Use of reactive process regulators in polymerisation processes at industrial site (with or without inclusion into/onto article) ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure 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. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	3,1 e7
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

Environmental factors not influenced by risk management

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

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Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.001	0.001	0.00001	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 74.3%. If discharged to a municipal sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. No wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 6.8e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	94,9
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

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

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation

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Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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. Closed bulk loading and unloading: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source to worker	Laboratory activities: No other specific measures identified. Storage: Handle substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where hand contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Closed bulk loading and unloading: Wear suitable gloves tested to EN 374. Open bulk loading and unloading: Wear suitable gloves tested to EN 374. Drum and small-pack filling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel. Industrial.

List of use descriptors

Sector(s) of use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Use of functional fluid at industrial site

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the 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

Batch process	Not applicable.
Continuous process	Emission days (days/year): 100

Environmental factors not influenced by risk management

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

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Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	100	0.005	0	0.00001	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 95
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 98.7%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 74.1%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 5.0e6 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.
Treatment efficiency	98,7
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	This substance is consumed during use and no waste of the substance is generated.
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as fuel (closed systems): No other specific measures identified.
Technical conditions and measures to control dispersion from source to worker	Storage: Store substance within a closed system. Use as fuel (closed systems): No other specific measures identified.
Organisational measures to prevent/limit accidental release, dispersion and exposure	Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. Bulk transfers: Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel. Professional.

List of use descriptors	
Sector(s) of use	SU22: Professional uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.
Amounts used	
Fraction of EU tonnage used in the 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	
Batch process	Not applicable.
Continuous process	Emission days (days/year): 365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10

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Local marine-water dilution factor	100

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Not applicable.
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 62.9%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Not available.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 6.9e4 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	94,9
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	This substance is consumed during use and no waste of the substance is generated.
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as fuel (closed systems): Provide a good standard of general ventilation (at least 3 to 5 air changes per hour).
Technical conditions and measures to control dispersion from source to worker	Drum/batch transfers: Use drum pumps or pour carefully from the container. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where hand contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. Bulk transfers: Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear suitable gloves tested to EN 374. Refuelling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel

List of use descriptors

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

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

Product characteristics

Physical state	The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	1,9 e7
Fraction of regional tonnage used locally	0,0005
Annual site tonnage	9500 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

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.001	0.00001	0.00001	

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Risk-management measures (RMM)

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

Conditions and measures related to a municipal sewage treatment plant

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

Type	No wastewater treatment is required.
Discharge rate	2000 m3/day
Sludge treatment technique	Not available.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 1.8e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	Not available.
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery 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

Concentration of substance in mixture	Covers substance content in product up to 100%.
Physical form of product	Liquid.
Vapour pressure	Liquid, vapour pressure > 10 kPa at standard temperature and pressure

Amounts used

Covers amounts up to	37500 g
Covers skin contact area up to	420 cm^2

Frequency and duration of use

	Duration	Frequency of use	Notes
Covers exposures up to	2	0.143 times per day	(duration unit = hour)

Human factors not influenced by risk management

Other given operational conditions affecting consumer exposure

Area of application	Room size	Temperature	Ventilation rate	Notes
Requires a room volume of maximum [m3]: ...	20 m3	Ambient temperature.	Typical ventilation	

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Other relevant operational conditions

Not available.

Risk-management measures (RMM)

Conditions and measures related to information and behavioural advice to consumers

Not available.

Conditions and measures related to personal protection, hygiene and health evaluation	No specific risk-management measures identified beyond the operational conditions stated above.

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 ECETOC Report No. 107 and Chapter R15 of the IR&CSA TGD. Where exposure determinants differ from these sources, this is indicated.

4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures.

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels.

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 environmental release category (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 process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure 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. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

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Amounts used

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

Frequency and duration of use

Batch process	Not applicable.
Continuous process	Not applicable.

Environmental 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**	**Notes**
Not applicable.					

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Restrictions apply to releases to the aquatic environment (see Section 4.2).

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Not available.
Soil	Not applicable.
Water	Not applicable.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Avoid release to the environment in accordance with legal requirements.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	Not available.
Sludge treatment technique	Not available.

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	Not available.
Notes	Combustion emissions considered in the regional exposure assessment.

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Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Notes	Combustion emissions considered in the regional exposure assessment.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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.
Technical conditions and measures to control dispersion from source to worker	Bulk transfers: Transfer through closed lines. Drilling-mud (re)formulation: No other specific measures identified. Solids-filter equipment operation, elevated temperature: Enclose the process with a correctly positioned capture hood. Waste treatment and disposal: Provide additional ventilation at emission points. Sampling: No other specific measures identified. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions.
Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. Filling equipment from drums or containers: Wear suitable gloves tested to EN 374. Drilling-platform operation: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Cleaning solids-filter equipment: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training.

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General exposures (open systems): Wear chemically resistant gloves tested to EN 374 in combination with basic employee training.

Pouring from small containers: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training.

Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Offshore drilling: Aquatic releases are restricted by law and industry prohibits discharge. OSPAR Commission 2009: Discharges, spills and emissions from offshore oil and gas installations in 2007, including assessment of data reported in 2006 and 2007.
Onshore drilling: Environmental releases are minimised during onshore drilling; recycling and waste disposal are managed under national and/or local regulations. International Finance Corporation 2007: Environmental, Health and Safety Guidelines for Onshore Oil and Gas Development. Mining Waste Directive (2006/21/EC), European Waste Directive (2008/98/EC) and national transpositions, for example the revised Kreislaufwirtschaftsgesetz (KrWG) in Germany.

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Functional fluids, industrial

List of use descriptors

Sector(s) of use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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)

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

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage	13.1 tonnes/year
Fraction of regional tonnage used locally	0,76
Annual site tonnage	10 tonnes/year
Maximum daily site tonnage	500 kg/day

Frequency and duration of use

Batch process	Not applicable.
Continuous process	Emission days (days/year): 20

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 0
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 61.5%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a municipal sewage treatment plant, no on-site wastewater treatment is required.

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Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 3.8e3 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	Not available.
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Treatment efficiency	94,9
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Filling articles/equipment (closed systems): Transfer through closed lines. Equipment operation (closed systems): No other specific measures identified.
Technical conditions and measures to control dispersion from source to worker	Bulk transfers: No other specific measures identified. Equipment operation (open systems): Limit the area of openings and provide extraction ventilation at emission points where substance is handled at elevated temperature.

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	Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions.
Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. Drum/batch transfers: Wear suitable gloves tested to EN 374. Article processing and reworking: Wear suitable gloves tested to EN 374. Filling equipment from drums or containers: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Where different risk-management measures/operational conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

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

List of use descriptors

Sector(s) of use	SU10: Formulation [mixing] of preparations and/or repackaging
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC2: Formulation into mixture

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List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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, pelletisation, granulation PROC15: Use as laboratory reagent

2.1.1. Contributing exposure scenario controlling environmental exposure for Formulation into mixture

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	3 e7
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

Batch process	Not applicable.
Continuous process	300 days/year

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.01	0.0001	0.0002	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 0

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Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 96.7%. If discharged to a municipal sewage treatment plant, provide required on-site wastewater removal efficiency of >= 31.5%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a domestic sewage treatment plant, no on-site wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	20000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 1.0e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	96,7
Notes	Not applicable.

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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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.
Technical conditions and measures to control dispersion from source to worker	Batch process at elevated temperatures: Provide additional ventilation at emission points. Drum/batch transfers: Use drum pumps or pour carefully from the container. Bulk transfers: Handle substance within a closed system. Mixing operations (open systems): Provide additional ventilation at emission points. Laboratory activities: No other specific measures identified. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Bulk transfers: Wear suitable gloves tested to EN 374. Production of preparations or articles by tabletting, compression, extrusion and pelletisation: Wear suitable gloves tested to EN 374. Drum and small-pack filling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Mixing operations (open systems): Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

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 environmental release category (ERC)	ERC6a: Use of intermediate
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Use of intermediate

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the 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

Environmental factors not influenced by risk management

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

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Other factors	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 80
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 94.4%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a domestic sewage treatment plant, no on-site wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 5.0e4 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	This substance is consumed during use and no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment efficiency	95,6

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

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

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation

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Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Operations are 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. Closed bulk loading and unloading: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source to worker	Laboratory activities: No other specific measures identified. Bulk product storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Closed bulk loading and unloading: Wear suitable gloves tested to EN 374. Open bulk loading and unloading: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Distribution of substance

List of use descriptors

Sector(s) of use	Distribution of substance
Name of contributing environmental scenario and corresponding environmental release category (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 (with or without inclusion into/onto article) ERC6d: Use of reactive process regulators in polymerisation processes at industrial site (with or without inclusion into/onto article) ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure 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. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	3,1 e7
Fraction of regional tonnage used locally	0,002
Annual site tonnage	61000 tonnes/year
Maximum daily site tonnage	200000 kg/day

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Frequency and duration of use

Continuous process	300 days/year

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	300	0.001	0.001	0.00001	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 90
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 74.3%. If discharged to a municipal sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment. No wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 6.8e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	94,9
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

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

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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. Closed bulk loading and unloading: Handle substance within a closed system.
Technical conditions and measures to control dispersion from source to worker	Laboratory activities: No other specific measures identified. Storage: Handle substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where hand contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. General exposures (open systems): Wear suitable gloves tested to EN 374. Closed bulk loading and unloading: Wear suitable gloves tested to EN 374. Open bulk loading and unloading: Wear suitable gloves tested to EN 374. Drum and small-pack filling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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Health

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

4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel. Industrial.

List of use descriptors

Sector(s) of use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC7: Use of functional fluid at industrial site
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Use of functional fluid at industrial site

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the 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

Batch process	Not applicable.
Continuous process	Emission days (days/year): 100

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Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	100	0.005	0	0.00001	

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 95
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 98.7%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 74.1%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater sediment.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 5.0e6 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.
Treatment efficiency	98,7
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	This substance is consumed during use and no waste of the substance is generated.
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as fuel (closed systems): No other specific measures identified.
Technical conditions and measures to control dispersion from source to worker	Storage: Store substance within a closed system. Use as fuel (closed systems): No other specific measures identified.
Organisational measures to prevent/limit accidental release, dispersion and exposure	Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. Bulk transfers: Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel. Professional.

List of use descriptors

Sector(s) of use	SU22: Professional uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the 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

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

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Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Not applicable.
Soil	Not applicable.
Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 62.9%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Not available.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 6.9e4 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	94,9
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

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

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Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Use as fuel (closed systems): Provide a good standard of general ventilation (at least 3 to 5 air changes per hour).
Technical conditions and measures to control dispersion from source to worker	Drum/batch transfers: Use drum pumps or pour carefully from the container. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions. Equipment cleaning and maintenance: Drain the system before equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation	Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where hand contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/ minimise exposure and report any skin problems that develop. Bulk transfers: Wear suitable gloves tested to EN 374. Drum/batch transfers: Wear suitable gloves tested to EN 374. Refuelling: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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.

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4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Use as fuel

List of use descriptors

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

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

Product characteristics

Physical state	The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage (tonnes/year)	1,9 e7
Fraction of regional tonnage used locally	0,0005
Annual site tonnage	9500 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

Environmental factors not influenced by risk management

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

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Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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 a municipal sewage treatment plant

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

Type No wastewater treatment is required.

Discharge rate 2000 m3/day

Sludge treatment technique Not available.

Notes Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 1.8e5 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment Combustion emissions are limited by required exhaust-emission controls. Combustion emissions are considered in the regional exposure assessment. External waste treatment and disposal must comply with applicable local and/or national regulations.

Disposal methods Not applicable.

Treatment efficiency Not available.

Notes Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery 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

Concentration of substance in mixture Covers substance content in product up to 100%.

Physical form of product Liquid.

Vapour pressure Liquid, vapour pressure > 10 kPa at standard temperature and pressure

Amounts used

Covers amounts up to 37500 g

Covers skin contact area up to 420 cm^2

Frequency and duration of use

	Duration	Frequency of use	Notes
Covers exposures up to	2	0.143 times per day	(duration unit = hour)

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Human factors not influenced by risk management

Other given operational conditions affecting consumer exposure

Area of application	Room size	Temperature	Ventilation rate	Notes
Requires a room volume of maximum [m3]: ...	20 m3	Ambient temperature.	Typical ventilation	

Other relevant operational conditions

Not available.

Risk-management measures (RMM)

Conditions and measures related to information and behavioural advice to consumers

Not available.

Conditions and measures related to personal protection, hygiene and health evaluation	No specific risk-management measures identified beyond the operational conditions stated above.

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 ECETOC Report No. 107 and Chapter R15 of the IR&CSA TGD. Where exposure determinants differ from these sources, this is indicated.

4. Guidance to downstream users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures.

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels.

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 environmental release category (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 process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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

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2.1.1. Contributing exposure 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. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

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

Frequency and duration of use

Batch process	Not applicable.
Continuous process	Not applicable.

Environmental 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**	**Notes**
Not applicable.					

Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Restrictions apply to releases to the aquatic environment (see Section 4.2).

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Not available.
Soil	Not applicable.
Water	Not applicable.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Avoid release to the environment in accordance with legal requirements.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	Not available.
Sludge treatment technique	Not available.

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Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	Not available.
Notes	Combustion emissions considered in the regional exposure assessment.

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Notes	Combustion emissions considered in the regional exposure assessment.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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.
Technical conditions and measures to control dispersion from source to worker	Bulk transfers: Transfer through closed lines. Drilling-mud (re)formulation: No other specific measures identified. Solids-filter equipment operation, elevated temperature: Enclose the process with a correctly positioned capture hood. Waste treatment and disposal: Provide additional ventilation at emission points. Sampling: No other specific measures identified. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions.

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Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. Filling equipment from drums or containers: Wear suitable gloves tested to EN 374. Drilling-platform operation: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Cleaning solids-filter equipment: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. General exposures (open systems): Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Pouring from small containers: Wear chemically resistant gloves tested to EN 374 in combination with basic employee training. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Offshore drilling: Aquatic releases are restricted by law and industry prohibits discharge. OSPAR Commission 2009: Discharges, spills and emissions from offshore oil and gas installations in 2007, including assessment of data reported in 2006 and 2007.
Onshore drilling: Environmental releases are minimised during onshore drilling; recycling and waste disposal are managed under national and/or local regulations. International Finance Corporation 2007: Environmental, Health and Safety Guidelines for Onshore Oil and Gas Development. Mining Waste Directive (2006/21/EC), European Waste Directive (2008/98/EC) and national transpositions, for example the revised Kreislaufwirtschaftsgesetz (KrWG) in Germany.

Health

Predicted exposures are not expected to exceed the DN(M)EL (derived no/minimal-effect level) when the risk-management measures/ operational conditions in Section 2 are implemented. Where different measures/conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

1. Functional fluids, industrial

List of use descriptors

Sector(s) of use	SU3: Industrial uses
Name of contributing environmental scenario and corresponding environmental release category (ERC)	ERC7: Use of functional fluid at industrial site

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List of names of contributing worker scenarios and corresponding process categories (PROCs)	PROC1: Chemical production or refinery in a closed process without likelihood of exposure, or processes with equivalent containment conditions PROC2: Chemical production or refinery in a 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 conditions 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 exposure scenario controlling environmental exposure for Use of functional fluid at industrial site

Product characteristics

Physical state	Liquid. The substance is a complex UVCB (substance of unknown or variable composition, complex reaction product or biological material). Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in the region	0,1
Regional use tonnage	13.1 tonnes/year
Fraction of regional tonnage used locally	0,76
Annual site tonnage	10 tonnes/year
Maximum daily site tonnage	500 kg/day

Frequency and duration of use

Batch process	Not applicable.
Continuous process	Emission days (days/year): 20

Environmental factors not influenced by risk management

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

Other given operational conditions affecting environmental exposure

	Emission days	Emission factors			
Type	**(days/year)**	**Air**	**Soil**	**Water**	**Notes**
Initial release before risk-management measures	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; conservative estimates of process release have therefore been used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Treat air emissions to provide typical removal efficiency of (%): 0
Soil	Not applicable.

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Water	Treat on-site wastewater before discharge to receiving waters to achieve required removal efficiency of >= 61.5%. If discharged to a domestic sewage treatment plant, provide required on-site wastewater removal efficiency of >= 0%.
Sediment	Not applicable.
Notes	Not applicable.
Organisational measures to prevent/limit releases from the site	Environmental exposure risk is driven by freshwater. Prevent discharge of undissolved substance to on-site wastewater, or recover it if discharged. If discharged to a municipal sewage treatment plant, no on-site wastewater treatment is required.

Conditions and measures related to a municipal sewage treatment plant

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

Type	Domestic sewage treatment plant
Discharge rate	2000 m3/day
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge must be incinerated, contained or reclaimed.
Notes	Maximum allowable site tonnage (MSafe), based on release following total wastewater-treatment removal: 3.8e3 kg/day

Conditions and measures related to external treatment of waste for disposal

Fraction of amount used transferred to external waste disposal

Suitable waste treatment	External treatment and disposal of waste must comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment efficiency	Not available.
Notes	Estimated substance removal from wastewater through domestic sewage treatment (%): 94.9

Conditions and measures related to external recovery of waste

Fraction of amount used transferred to external waste disposal

Suitable recovery operations	External recovery and recycling of waste must comply with applicable local and/or national regulations.
Treatment efficiency	94,9
Notes	Not applicable.

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

Product characteristics

Physical form of product	Liquid with potential for aerosol generation
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure

Amounts used

Covers substance content in product up to 100%.

Frequency and duration of use

Covers daily exposure up to 8 hours.

Human factors not influenced by risk management

Other given operational conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented.

Other relevant operational conditions

Assumes use at no more than 20 C above ambient temperature, unless otherwise stated.

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Risk-management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Filling articles/equipment (closed systems): Transfer through closed lines. Equipment operation (closed systems): No other specific measures identified.
Technical conditions and measures to control dispersion from source to worker	Bulk transfers: No other specific measures identified. Equipment operation (open systems): Limit the area of openings and provide extraction ventilation at emission points where substance is handled at elevated temperature. Storage: Store substance within a closed system.
Organisational measures to prevent/limit accidental release, dispersion and exposure	General measures for all activities: Control potential exposure by measures such as contained or closed systems, suitably designed and maintained facilities and a good standard of general ventilation. Drain systems and clear transfer lines before breaking containment. Clean and flush equipment where possible before maintenance. Where exposure is possible, ensure relevant personnel are informed of its nature and understand basic measures to minimise exposure; provide suitable personal protective equipment; clean up spills and dispose of waste in accordance with regulatory requirements; monitor the effectiveness of controls; consider the need for health surveillance; identify and implement corrective actions.
Conditions and measures related to personal protection, hygiene and health evaluation	General measures (skin irritants): Avoid direct skin contact with the product. Identify potential areas of indirect skin contact. Wear gloves tested to EN 374 where skin contact is likely. Clean up contamination/spills immediately. Wash any skin contamination off immediately. Provide basic employee training to prevent/minimise exposure and report any skin problems that develop. Drum/batch transfers: Wear suitable gloves tested to EN 374. Article processing and reworking: Wear suitable gloves tested to EN 374. Filling equipment from drums or containers: Wear suitable gloves tested to EN 374. Equipment cleaning and maintenance: Wear chemically resistant gloves tested to EN 374 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 users to evaluate whether they work within the boundaries set by the exposure scenario (ES)

Environment

Guidance is based on assumed operating conditions which may not apply at all sites; scaling may therefore be necessary to define risk-management measures. Required wastewater removal efficiency can be achieved by on-site or off-site technologies, alone or in combination. Required air removal efficiency can be achieved by on-site technologies, alone or in combination. Further details of scaling and control technologies are in the SpERC factsheet (http:cefic.org/en/reach-for-industires-libraries.html).

Health

Where different risk-management measures/operational conditions are adopted, users must ensure risks are controlled to at least equivalent levels. Available hazard data do not allow derivation of a DNEL for skin-irritant effects. Available hazard data do not support the need to establish a DNEL for other health effects. Risk-management measures are based on quantitative risk characterisation.

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