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

1.1 Product identifier

Substance/mixture name	Gasoil (petroleum), straight-run flux ATZ
Synonyms	GSR lgt
CAS Number	64741-43-1
EC Number	265-043-1
Index number	Not available
Registration Number	01-2119488519-20-0030

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

***Relevant identified uses**:* heating fuel and other industrial uses

Uses identified in the chemical safety report: generic list of applications:

Life Cycle:

Manufacture:	Production of the substance
Formulation:	Formulation and (re)packaging of substances and mixtures
Use at industrial sites:	Use as an intermediate, use in drilling and production of wells for the extraction of oil and natural gas, use in fuels
Generalized use by professional operators:	Use in fuels.
Consumer Use:	Use in Fuels

Uses advised against: Professional uses or the consumption of SRGO (straight run gas oils) substances (in coatings, detergents, lubricants, metalworking fluids, binding and release agents, explosives, functional fluids, road and construction applications and other consumer uses are not recommended. Although these uses were previously supported, in 2011 ECHA's Committee for Risk Assessment (RAC) issued an opinion stating that certain petroleum substances in the Naphtha and Kerosine categories had a risk of chronic toxicity to the central nervous system. The opinion proposes stricter exposure limits that are incompatible with the chemical safety assessments carried out for these uses of SRGO substances. As SRGO substances have similarities with the substances specified in the opinion, the opinion applies to all SRGO substances.

Reasons why uses advised against: Uses other than those identified as relevant are not recommended unless an assessment has been carried out prior to the start of such use indicating that the risks associated with such use are safe.

See the Annex for the full list of uses for which an exposure scenario is envisaged.

1.3 Details of the supplier of the safety data sheet

Company name	ALMA PETROLI S.p.A.
Address	Via di Roma 67 - Via Baiona 195
City / Country	Ravenna - Italy
Phone0	039054434317-00390544696411
Competent technician E-mail	info@almapetroli.com

1.4 Emergency telephone number

For Appropriate National Emergency Information Services see the following link:

https://echa.europa.eu/support/helpdesks

Alma Petroli - Sciascia Antonino (Employer) - Mob. 3461305790 (24 hours)

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Flamm Liq. 3;	H226
Asp. Tox. 1;	H304
Acute tox. 4;	H332
STOT RE 2;	H373 (liver, spleen and bone marrow)
Aquatic Chronic 2;	H411

The list of hazard statements H is given in Section 16.

Note: The classification has been assigned taking into account the following SRGO characteristics: Viscosity ≤ 20.5 mm^2/s at 40 °C; Flash point ≥ 23 °C and ≤ 75 °C.

2.2 Label elements

Warning: DANGER

Hazard statements:

H226:	Flammable liquid and vapour
H304:	May be fatal if swallowed and enters airways
H332:	Harmful if inhaled
H373:	May cause damage to organs through prolonged or repeated exposure

H411: Toxic to aquatic life with long lasting effects
EUH066: Repeated exposure may cause skin dryness or cracking

Precautionary statements:

Prevention

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P273: Avoid release to the environment.
P280: Wear protective gloves/ protective clothing/eye protection/face protection.

Reaction

P301+310: IF SWALLOWED: Immediately call a POISON CENTER/doctor
P332+313: If skin irritation occurs: Get medical advice/attention.
P331: Do NOT induce vomiting.

Disposal

P501: Dispose of contents/container in accordance with the local regulations.

Other information: Not available
Authorization number Not applicable

2.3 Other hazards

The heated product emits vapors that can form flammable and explosive mixtures with air. Vapors are heavier than air: they can accumulate in confined spaces or in depressions, propagate at ground level and can create risks of fire and explosion even at a distance. There is a risk of thermal burns in case of direct contact with the skin or eyes when the product is handled at high temperature. A potential risk may be the development of hydrogen sulfide (toxic gas) when the product is stored or handled at high temperatures. If present, hydrogen sulfide can accumulate in tanks or confined places, with hazard to operators who need to access it. In this case overexposure can cause irritation of the respiratory tract, dizziness, nausea, loss of consciousness and death.

The product does not meet the PBT or vPvB classification criteria set out in Annex XIII to REACH.

The substance is not included in the list established in accordance with Article 59(of REACH for the possession of endocrine disrupting properties, or is not identified as having endocrine disrupting properties according to the criteria established by Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

The substance is a complex combination of hydrocarbons produced by distillation of crude oil. It consists of hydrocarbons with carbon numbers predominantly in the range C11-C25 and boiling point of about 205 °C - 400 °C.

Denomination	EC	CAS	Index number	Registration number
Gas oils (petroleum), straight-run	265-043-1	64741-43-1	-	01-2119488519-20-0030

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

Before any intervention: Spills make the surface slippery. Before attempting to save the victims, isolate the area from all potential sources of ignition, including disconnecting the power supply. Ensure adequate ventilation and ensure that there is a safe and breathable atmosphere before entering confined spaces. Hydrogen sulfide (H_2S) can accumulate in the headspace of storage tanks and reach potentially dangerous concentrations.

Eye contact: Irrigate the eyes with 0.9% saline, if available, or water for at least 15 minutes. Remove the contact lenses, if the situation allows you to carry out the operation with ease. In case of irritation, blurred vision or persistent swelling, consult a specialist doctor.

Skin contact: Remove contaminated footwear and clothing and dispose of them safely. Wash the affected part with soap and water for 10-15 minutes. See a doctor immediately in case irritation, swelling or redness develops and persists.

For minor thermal burns cool the injured part. Keep the burned part under cold running water for at least five minutes, or until the pain disappears. Avoid general hypothermia. See section 2.3.

When using high-pressure equipment, a product injection may occur. In case of injuries caused by high pressure, immediately consult a doctor. Do not wait for the onset of symptoms.

Ingestion/aspiration: Do not cause vomiting to avoid the risk of aspiration. Do not give anything by mouth to a person in a state of unconsciousness. In case of spontaneous vomiting, keep your head down to avoid the risk of aspiration of vomiting into the lungs.

Inhalation: Inhalation of vapors at room temperature is unlikely due to the low vapour pressure of the product. Exposure to vapours can, however, occur when the product is handled at high temperatures under conditions of poor ventilation. In case of symptoms of inhalation of fumes, mists or vapors, if safety conditions allow, transfer the injured person to a quiet and well-ventilated place.

If the injured person is unconscious and does not breathe, check for the absence of obstacles to breathing and practice artificial respiration by specialized personnel. If necessary, carry out an external cardiac massage and consult a doctor.

If the injured person breathes, keep him in a safe lateral position. Administer oxygen if necessary. If there is any suspicion of inhalation of H_2S (hydrogen sulphide) rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures. Send patient to hospital. Immediately begin artificial respiration if breathing has ceased. Always assume that aspiration has occurred.

4.2 Most important symptoms and effects, both acute and delayed

Due to the low viscosity the product can be sucked into the lungs or directly following ingestion or subsequently in case of spontaneous or provoked vomiting, in this case chemical pneumonia may arise. May cause damage to organs through prolonged or repeated exposure. It can cause skin irritation, slight eye irritation, irritation of the respiratory tract caused by excessive exposure to fumes, mists or vapors. In case of ingestion: few or no expected symptoms. Possibly, nausea and diarrhea may occur. Inhalation can cause headaches, nausea, dizziness. Acute exposure to high doses can cause: depression of the central nervous system, confusion, altered mental state, convulsions, cardiac arrhythmias.

4.3 Indication of any immediate medical attention and special treatment needed

In case of ingestion, always assume that aspiration has occurred. Immediately transfer the injured person to the hospital. Do not wait for the onset of symptoms.

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Small fires: earth or sand, carbon dioxide, foam, dry chemical powder. Large fires: foam, water spray. Note: The use of fractional jet water (spray water) is reserved for specially trained personnel. Other inert gases (as permitted by law).

Unsuitable extinguishing media: Do not use direct water jets on the burning product, they can cause splashes and spread the fire. Avoid using foam and water simultaneously on the same surface as water destroys the foam.

5.2 Special hazards arising from the substance or mixture

Incomplete combustion could generate a complex mixture of airborne solid and liquid particles and gases, including carbon monoxide, H_2S (hydrogen sulfide), SOx (sulfur oxides), H_2S (hydrogen sulphide), H_2SO_4 (sulfuric acid), and other unidentified organic and inorganic compounds.

5.3 Advice for firefighters

In the event of a large fire or in confined or poorly ventilated spaces, wear a garment complete with fireproof protection and a stand-alone respirator equipped with a complete mask working under positive pressure.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

If safety conditions permit, stop or contain the leak at source. Avoid direct contact with the released material. Stay windward. In the event of large spills, warn residents of leeward areas. Remove uninvolved personnel from the spill area. Warn emergency teams. Except in the case of small payments, the feasibility of the interventions must always be evaluated and approved, if possible, by qualified and competent personnel in charge of managing the emergency. Eliminate all sources of ignition if safety conditions allow (e.g. electricity, sparks, fires, torches). In those cases when the presence of dangerous amounts of H_2S in the leaked/spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training).

6.1.2 For emergency personnel

Small spills: Traditional antistatic work clothes are generally appropriate.

Large spills: total protection garment resistant to chemical agents and made of antistatic material. Work gloves that provide adequate resistance to chemical agents, in particular aromatic hydrocarbons. Gloves made of PVA (Polyvinyl alcohol) are not water resistant and are not suitable for emergency use. Protective helmet. Antistatic and non-slip safety shoes or boots. Resistant to chemical agents. Goggles or face protection equipment if splashes or contact with eyes are possible or foreseeable. Respiratory protection: A half-mask or a whole mask equipped with an organic vapour filter(s) (and H_2S where applicable) or a stand-alone respirator may be used depending on the extent of the spillage and the foreseeable level of exposure. If the situation cannot be fully assessed or if there is a risk of oxygen starvation, use only an autonomous respirator.

The concentration of H_2S in the headspaces of the tank can reach dangerous values, especially in case of prolonged storage. This situation is especially relevant for those operations that involve direct exposure to vapors in the tank. (Subject to applicability): Spills of limited quantities of products, especially in the open air when the vapours usually disperse rapidly, are dynamic situations, which would hardly lead to exposure to dangerous concentrations. Since H2S

has a higher density than ambient air, a possible exception may be the accumulation of dangerous concentrations at specific points, such as trenches, depressions or confined spaces. In all these circumstances, however, correct actions should be assessed on a case-by-case basis.

6.2 Environmental precautions

Prevent the product from ending up in sewers, rivers or other bodies of water.

6.3 Methods and material for containment and cleaning up

Spreading on the ground: If necessary, stem the product with dry earth, sand or other non-flammable material. Large spills can be carefully covered with foam, if available, in order to prevent fire hazards. Do not use direct jets. Inside buildings or confined spaces, ensure appropriate ventilation. Absorb the poured product with non-flammable materials. If it is necessary to store contaminated material for subsequent safe disposal, use only suitable containers (watertight, sealed, waterproof, grounded). In case of soil contamination, remove contaminated soil and treat in accordance with local legislation.

Spills in water: In case of small spills in closed waters (e.g., in ports) contain the product using floating barriers or other devices. Collect the poured product with specific floating absorbent materials. Large spills: if possible, contain major spills into the water using floating barriers or other mechanical means. The use of dispersing agents must be proposed by an expert and, if requested, authorized by the competent local authorities. If possible, collect the contaminated product and material by mechanical means and proceed with storage/disposal in accordance with the relevant legislation.

The recommended measures are based on the most likely spill scenarios for this product. Local conditions (wind, air temperature, direction and speed of waves and currents) can, however, significantly influence the choice of action to be taken. Consult, therefore, local experts if necessary.

6.4 Reference to other sections

For more information about personal protective equipment, please refer to the section "Exposure control and personal protection".

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Ensure that all provisions regarding the management and storage facilities for flammable products are properly complied with.

A specific assessment of the risks of inhalation from the presence of H_2S in tank headspaces, confined spaces, product residues, waste and tank discharge water and inadvertent releases should be carried out to help determine controls appropriate to local circumstances.

Take precautionary measures against static electricity. Ensure the grounding of the container, tanks and equipment for reception and transfer. Steam is heavier than air. Pay special attention to accumulation in wells and confined spaces. Keep away from heat sources/sparks/open flames/hot surfaces. No smoking. Avoid contact with skin and eyes. Do not swallow. Do not breathe in the vapors.

Product may release Hydrogen Sulphide: a specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances

Use and store exclusively outside or in a well-ventilated place. Avoid contact with the product. Use appropriate personal protective equipment if necessary. Do not use compressed air during filling, unloading or handling operations. Prevent the risk of slipping. Do not release into the environment.

Make sure that adequate cleaning measures are taken (housekeeping). Contaminated material must not accumulate in the workplace and should never be stored in your pocket. Keep away from food and drink. Avoid contact with skin. Do not eat, drink or smoke while using the product. Wash your hands thoroughly after handling. Do not reuse contaminated clothing.

7.2 Conditions for safe storage, including any incompatibilities.

The structure of the storage area, the characteristics of the tanks, the equipment and the operating procedures must comply with the relevant legislation at European, national, or local level. Storage facilities must be equipped with appropriate systems to prevent contamination of soil and water in the event of leaks or spills. The activities of cleaning, inspection, and maintenance of the internal structure of the storage tanks must be carried out by qualified and properly equipped personnel, as established by national, local, or company regulations, after reclamation of the tank. Before accessing the storage, tanks and starting any type of intervention in a confined space, check the atmosphere and check the oxygen content, H_2S (Hydrogen sulphide), and the degree of flammability. Store separately from oxidizing agents. Store in a well-ventilated place.

Recommended materials: mild steel or stainless steel for containers and coatings. Some synthetic materials may not be suitable for containers or coatings based on the characteristics of the material and the intended uses. Check the compatibility of the materials with the manufacturer in relation to the conditions of use.

If the product is supplied in containers, store only in the original containers or in a container suitable for the type of product.

Store containers carefully closed and properly labeled. Protect from sunlight.

Light hydrocarbon vapors can accumulate at the top of the containers. This can cause danger of fire or explosion. Empty containers may contain combustible product residues. Do not weld, braze, drill, cut or incinerate empty containers unless they have been properly reclaimed.

7.3 Specific end use(s)

See the attached exposure scenarios.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure limit values (ACGIH 2023):

Diesel fuel:

TLV-TWA®: 100 mg/m^3

Hydrogen sulphide

ACGIH 2023

TLV®-TWA: 1 ppm (1,4 mg/m^3)

TLV®-STEL: 5 ppm (7 mg/m3)

Dir 98/24/EC and further amendments

Hydrogen sulphide

8 hours: 7 mg/m^3; 5 ppm

Short term: (4 hours): 14 mg/m^3; 10 ppm

Monitoring procedures: refer to good industrial hygiene practices.

DNEL (Derived No Effect Level)

	DNEL for workes				DNEL for the general population			
Route	Systemic effects Long term	Systemic effects Acute	Local effects Long term	Local effects Acute	Systemic effects Long term	Systemic effects Acute	Local effects Long term	Local effects Acute
Oral	n.a.	n.a.	n.a.	n.a.	1.25 mg/kg/day Most sensitve end point: Repeated dose toxcity (dermal)	No hazard identified	n.a.	n.a.
Dermal	2.91 mg/kg/d sensitve end point: Repeated dose toxcity (dermal)	No hazard identified	No hazard identified	No hazard identified	1.25 mg/kg Most sensitve end point: Repeated dose toxcity	No hazard identified	No hazard identified	No hazard identified
Inhalation	16.4 mg/m^3 Most sensitve end point: Developmental toxicity / teratogenicity (Dermal)	1500.8 mg/m^3 Most sensitve end point: Acute toxicity (Inhalation)	No hazard identified	No hazard identified	4.85 mg /m^3 Most sensitve end point: Developmental toxicity / teratogenicity (Dermal)	900.48 mg /m^3 Most sensitve end point: Acute toxcity	No hazard identified	No hazard identified
Eyes	n.a.	n.a.	n.a.	No hazard identified	n.a.	n.a.		No hazard identified

PNEC(S) (No Effect Expected Concentration)

PNEC(S) Water, sediment, soil	
-	The substance is a UVCB hydrocarbon with chronic danger to the aquatic environment. The "hydrocarbon block" method is used for environmental risk assessment (REACh R7 Guide paragraph 13- PNECs cannot be derived for UVCB substances for which aquatic PNECs for "hydrocarbon blocks" (i.e. a library of about 1500 representative hydrocarbons and grouped according to physical and chemical properties, breakdown and degradation properties), were derived using the statistical extrapolation method HC5 and the target Lipid Model (TLM). Following specific requests from ECHA, a revision of the TLM model was carried out which led to new results used in the CSR 2016 edition. For details refer to the annex to section 13 of IUCLID. PETRORISK Product Library tab, PAH Phototoxicity, PNEC HC5, TLM Validation, PETROTOX Verification and NOS Heterocyclics.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Minimize exposure to mists/vapours/aerosols. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content , hydrogen sulphide, and flammability

8.2.2 Individual protection measures, such as personal protective equipment

a) Eye/face protection:

In the absence of containment systems and in the event of a risk of contact with eyes/faces, wear head and face protection (visor and/or goggles (EN 166).

b) Skin protection:

(i) Hand protection

In the absence of containment systems and in case of possibility of contact with the skin, use gloves with high cuffs resistant to hydrocarbons, internally plush and thermally insulated if necessary. Materials presumably suitable: nitrile, PVC or PVA (polyvinyl alcohol) with a chemical protection index of at least 5 (permeation time > of 240 minutes). Use gloves in accordance with the conditions and limits set by the manufacturer. In the case, refer to the UNI EN 374 standard. Gloves must be periodically inspected and replaced in case of wear, perforation or contamination.

(ii) Other

In case of counting of clothing, replace and clean them immediately.

c) Respiratory protection:

In open/ventilated spaces:

wear approved respiratory protection devices: full face masks equipped with type A filter cartridge (for organic vapors) (UNI EN14387: 2021)

In the absence of containment systems

- in case of suspected presence of hydrogen sulphide, wear full masks equipped with a type B filter/cartridge (grey for inorganic vapors, H_2S included) (UNI EN14387: 2021)
- If exposure levels cannot be determined or estimated with adequate confidence, or an oxygen deficiency is possible, only SCBA's should be used (UNI EN 11719: 2018)

d) Thermal hazards: see point (b) above.

8.2.3 Environmental exposure controls

Do not release into the environment. Storage facilities must be equipped with appropriate systems to prevent contamination of soil and water in the event of leaks or spills. Prevent the release of undissolved substances or recover them from wastewater. For more details see the attached exposure scenarios.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

(a)physical state	Liquid
b)color	blackish
c)odour	Oil
(d) melting point/freezing point	-21 to +6 °C (ASTM 1999 CONCAWE 2010a)
(e) boiling point or boiling starting point and boiling range	165 °C 165 °C - >375 °C (test report GE10-01296.00)
(f) flammability	Flammable liquid
(g) lower and upper explosive limit	LEL 1% - UEL 6%

(h) flash point	69 °C (Pensky Martens- ISO 2719; test report 15PR0397
(i) auto-ignition temperature	≥240 °C (CONCAWE 2010a)
(j) decomposition temperature	Data not available
(k) pH	Data not available
(l) kinematic viscosity	3.212 mm^2/s at 40 °C (ASTM D445; test report GE10-01296.00)
(m) solubility	2.69E-12 – 2000 mg/l (calculated range-QSAR)
(n) partition coefficient n-octanol/water (logarithmic value):	1.99-18.2 (calculated range-QSAR)
(o) vapour pressure	0.4 kPa at 40 °C (ASTM199)
(p) density and/or relative density	895 kg/m^3 at 15 °C (ASTM D1298; test report GE10-01296.00)
(q) relative vapour density	Data not available
(r) particle characteristics	Not applicable

9.2 Other information

9.2.1. Information with regard to physical hazard classes

The product is flammable. Nessun chemical group associated with molecules contained with explosive properties (Ref. column 2 of REACH of Annex VII). Non-oxidant (based on the chemical structure, the substance is not able to react exothermically with combustible materials. Ref. column 2 of REACH of Annex VII).

9.2.2. Other safety characteristics

The product does not possess dangerous properties that require mention.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

The substance has no additional reactivity hazards than those listed in the following subtitles.

10.2 Chemical stability

This substance is stable in relation to its intrinsic properties.

10.3 Possibility of hazardous reactions

Contact with strong oxidants (such as peroxides and chromates) can cause a fire hazard. A mixture with nitrates or other strong oxidants (such as chlorates, perchlorates and liquid oxygen) can generate an explosive mass. Sensitivity to heat, friction and shock cannot be assessed in advance.

10.4 Conditions to avoid

Store separately from oxidizing agents. Keep away from heat sources/sparks/open flames/hot surfaces. No smoking. Avoid the formation of electrostatic charges.

10.5 Incompatible materials

Strong oxidants.

10.6 Hazardous decomposition products

The product does not decompose when used for its intended uses.

SECTION 11. TOXICOLOGICAL INFORMATION

No data are available on the toxicokinetics of gas oils in vivo. Experimental studies in animals have shown absorption through the lungs. Considerations on physico-chemical properties suggest that highly breathable aerosols of poorly water-soluble substances with a log Pow higher than zero are absorbed to some degree by the respiratory tract. In the absence of further information, it is assumed that 50% of the inhaled dose of gasoil aerosol is absorbed by the lungs in animals and humans. No data are available on the dermal absorption of gas oils, however repeated toxicity studies indicate that some absorption through the skin is possible. The application of the SPINKERM model indicates that the

absorption of diesel through the skin is probably low (estimated dermal flow: 0.0001058 mg cm^{-2}.hour for human skin). However, since the reliability of this value is not known, a complete absorption of diesel through the human skin is assumed conservatively.

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

a) Acute toxicity

Oral

Acute oral toxicity of samples belonging to the category of straight run middle gas oils has been evaluated in a number of studies. All studies have shown an oral LD50 > 2000 mg/kg, therefore the product is not classified for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
Oral			
RAT (F/M) ORAL (gavage) OECD Guideline 401	LD50: > 5000 mg/kg (M/F)	Reliable key study without restriction CAS 64741-44-2	API (1985a)

Inhalation

Rat studies are available to evaluate the acute inhalation toxicity of products belonging to the category of straight run middle gas oils. These results lead to the classification of the substance Acute tox. 4; H332 (Harmful if inhaled).

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
RAT (M/F) aerosol OECD Guideline 403	LC50: >2.53 mg/L air (M/F)	Key study reliable without restrictions CAS 64741-44-2	EMBSI 1991

Dermal

Acute oral toxicity of samples belonging to the category of straight run middle gas oils has been evaluated in a number of studies. All studies have shown a cutaneous LD50 > 2000 mg/kg, therefore the product is not classified for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
Cutanea Street			
RABBIT OECD Guideline 402	LD50>2000 mg/kg) (M/F)	Key study CAS 64741-44-2 Reliable without restrictions	API (1985a)

b) Skin corrosion/irritation

No specific studies on the corrosivity of this substance are available. Considering the information from available animal studies and the nature of the substance, no corrosive action is expected.

The potential for skin irritation of samples belonging to the category of this product has been tested in a large number of studies typically conducted on rabbits. Only a few studies show mild skin irritation. These results do not lead to any classification for this endpoint. Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
RABBIT Occlusive treatment (on each animal two sites with intact skin and 2 sites with abraded skin) Observation at 24/72 hours OECD Guideline 404	Non-irritating Average erythema score: 1.8 of max 4 (on intact skin) Average edema score: 1.58 of max 4 (on intact skin)	Key study Reliable with restrictions CAS 64741-44-2	API (1985a)

c) Serious eye damage/irritation

The potential for eye irritation of samples belonging to the category of this product has been tested in a large number of studies typically conducted on rabbits. The conclusions of these studies indicate an absence of significant irritation on the eyes, therefore the substance is not classified as irritating to the eyes. Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
RABBIT Observation at 24/48/72 hours OECD Guideline 405	Non-irritating Average corneal score: 0 of max 80 (average) Average iris score: 0 of max 10 (average) Average conjunctiva score: 0 of max 20 (average)	Key study Reliable without restrictions CAS 64741-44-2	API (1985a)

d) Respiratory or skin sensitisation

Respiratory sensitization

Information not available. This endpoint is not a REACH requirement.

Skin sensitization

A skin sensitization study was conducted for the category of straight run middle gas oils. The result of this study indicates the absence of skin sensitization potential, therefore no classification of the substance is required for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
GUINEA PIG Buehler test Guideline 406	Non-sensitizing	Support studio Reliable without restrictions CAS 64741-44-2	API (1985a)

e) Germ cell mutagenicity

In vitro bacterial mutation tests (modified Ames test) and in vivo chromosomal aberration tests were negative. Based on the evidence, straight run gas oils are unlikely to be mutagenic in humans and therefore do not meet the criteria for classification for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
In vitro gene mutation (Ames Test) in Salmonella thyphimurium TA 98 Doses: 5, 10, 15, 20, 30, 40, 50, 60 µl/plate OECD Guideline 471	Positive with metabolic activation (marginally mutagenic)	Key study Reliable with restrictions CAS:64741-44-2 and CAS68814-87-9	Deininger, G., Jungen, H., Wenzel-Hartung, R. (1991)
bacterial reverse mutation assay in S. typhimurium TA 98 with metabolic activation. Servings: 0, 12, 24, 36, 48, 60 µl/plate	negative - MI = 0.15 for S. typhimurium TA 98 with metabolic att.. Genotoxicity and cytotoxicity: negative	Key study Reliable without restrictions CAS 64741-44-2	May, K. 2013

f) Carcinogenicity

Prolonged exposure to straight run gas oils can cause severe dermal irritation that can evolve into skin cancers (see study below). In the absence of irritation the appearance of tumors was NOT observed. Therefore straight run gas gases do not require any classification for this endpoint.

Method	Result	Comments	Source
MOUSE (males) Exposure: 24 months Doses:50 µl Exposure half life (3 times a week) OECD 453	Result: an incidence of neoplasms in treated animals of 22% was found	Key study Reliable with restrictions CAS: 64741-44-2	API (198

g) Reproductive toxicity

Fertility toxicity

Developmental studies found positive effects only at doses that also caused maternal toxicity. Therefore, no classification of the substance is required for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
rat (Sprague-Dawley [rat]) female Servings: 1, 259 or 1036 mg/kg/day	First generation (P0) NOAEL (PO) 1 mg/kg bw/day) (female) according to: vaginal discharge, body weight, body weight gain, food consumption Irritation F1 generation NOAEL : 1 mg/kg bw/day (male/female) based on: reduction in the weight of the fetus	Key study Reliable with restrictions CAS 64741-43-1	ARCH 1994

Developmental toxicity/teratogenesis

Developmental studies have found positive effects only at doses that have also resulted in maternal toxicity. Therefore, no classification of the substance is required for this endpoint.

Below is a summary of the most representative studies of the Registration Dossier.

Method	Result	Comments	Source
RAT Dermal exposure route Doses/concentrations: 0, 50, 250 or 500 mg/kg bw/day Vehicle: acetone Exposure: 0 to 19 days of gestation	Mothers: LOAEL: 50 mg/kg bw/day NOAEL: 50 mg/kg bw/day Unspecified fetal abnormalities	Key study Reliable without restrictions CAS 68915-97-9)	ARCO 1993

h) STOT-single exposure

No specific toxicity to target organs following single exposure.

i) STOT-repeated exposure

A dermal NOAEL of 30 mg/kg/day and an inhaled NOAEC of 1.75 mg/l for read-across were identified.

Based on the results obtained, the substance has been classified as STOT RE 2; H373 pursuant to CLP Regulation; the target organs are liver, spleen and bone marrow.

Below is a summary of the most representative studies of the Registration Dossier

It should be noted that for the oral exposure route there is no information in the registration dossier (it is not necessary to carry out repeated toxicity studies orally, as the main routes of exposure for humans are dermal and inhalation – ref. column 2, Annex IX of the Reach Regulation).

Method	Result	Comments	Source
Inhalation			
RAT (M/F) Inhalation (Aerosol) Exposure: 13 weeks (sub-chronic) OECD Guideline 413	NOAEC: >1.71 mg/l systemic effects (male/female) NOAEC: 0.88 mg/l local effects (lung weight) (male/female)	Key study Read-across Reliable with restrictions Diesel fuel	Lock, S., Dalbey, W. Schmoyer, R., Griesemer, K. (1984)
Dermal			
RAT (M/F) Exposure: 13 weeks OECD Guideline 411	NOAEL: 30 mg/kg bw/day clinical signs (M/F); body weight, hematology; clinical chemistry; weight of organs	Key study Reliable with restrictions CAS 68334-30-5	Mobil (1989)

j) Aspiration hazard

Since straight run gas oils have a viscosity < 20.5 mm2/s to 40 °C, it is possible that the product is sucked into the lungs according to the criteria set out in Annex I part 3 of Regulation 1272/2008.

Therefore the product is classified as Asp. Tox. 1; H304 (May be fatal if swallowed and enters airways).

11.2 Information on other hazards

11.2.1. Endocrine disrupting properties

The substance is not included in the list established in accordance with Article 59(1) of REACH for the possession of endocrine disrupting properties, or is not identified as having endocrine disrupting properties according to the criteria established by Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

11.2.2. Other information

Not available.

SECTION 12. ECOLOGICAL INFORMATION

Based on the ecological information below, the toxicity of fish, invertebrates and algae and the criteria indicated by the regulations on dangerous substances, straight run diesel is classified as Aquatic Chronic 2; H411 (toxic to aquatic organisms with long-lasting effects).

12.1 Toxicity

Below is a summary of the most representative studies of the Registration Dossier.

Endpoint	Result	Comments
Aquatic toxicity		
Invertebrates Daphnia magna Short term	EL50 48 h: 68 mg/L LL50: 9,983 mg/L.	Key study Reliable with restrictions Read-Across Shell report 6304 (1996).
Invertebrates Daphnia magna Long term	NOEL 21/day: 0.167 mg/l	Key study Reliable with restrictions QSAR Redman, et al. (2010b)
Algae Raphidocelis subcapitata Short term	ErL50: mg/L EL50: 2,079 mg/L.	Key study Reliable with restrictions Read-across Shell (6304) study and Clark (2003) PETROTOX
Microorganisms Tetrahymena pyriformis	EL50 40 h>1000mg/L NOEL: 3.099mg/L	PETROTOX
Fish Oncorhynchus mykiss Short term	LL50 96/hour: 1.301 mg/l	Key study Reliable with restrictions QSAR Redman, et al. (2010b)
Fish Oncorhynchus mykiss Long term	NOEL 14 days: 0.068 mg/l	Key study Reliable with restrictions QSAR Redman, et al. (2010b)

12.2 Persistence and degradability

Abiotic degradability

Hydrolysis: Straight run gas oils are resistant to hydrolysis due to the lack of a functional group that is hydrolytically reactive. Therefore, this process will not contribute to a measurable loss of degradation of the substance in the environment.

Photolysis in air, water And soil: This substance contains hydrocarbon molecules that absorb UV light below 290 nm, a range of UV light that does not reach the Earth's surface. Therefore, this substance does not have the potential to undergo photolysis in water and soil, and this fate process will not contribute to a measurable degradation loss of this substance from the environment.

Biotic degradability

biodegradation in water: degradation was achieved at various levels in the available tests. Two tests indicate that the substance is easily biodegradable (ignoring the 10-day window). Since the 10-day window is not relevant for UVCB substances, the substance is considered easily biodegradable. % Degradation of the test substance: 57.5 after 28 days (Canale, A.J. 1999); 35.85 after 7 days, 41.96 after 14 days, 39.4 after 21 days, 34.82 after 28 days (Lee, C. 1993)

Sediments: range of 4.07-661986 days

Soil: range of 1.02-165496 days

12.3 Bioaccumulative potential

Standard tests for this endpoint are not applicable to UVCB substances.

A BCF for aquatic-fish species of 0.4-6280 l/kg was calculated by QSAR for the constituents of the UVCB.

12.4 Mobility in soil

Koc absorption: Standard tests for this endpoint are not applicable to UVCB substances.

A Log Koc of 1.71-14.70 was calculated by QSAR for the constituents of the UVCB.

12.5 Results of PBT and vPvB assessment

Comparison with th of Annex XIII of the REACh Regulation

The UVCB substance does not contain any PBT / vPvB constituents included in the SVHC Candidate List at concentrations above 0.1%. No other representative hydrocarbon structures were found to meet the PBT / vPvB (Evaluation of PBT for Petroleum Hydrocarbons criteria. ”Concawe, 2019”. In conclusion, the substance does not meet the PBT or vPvB classification criteria set out in Annex XIII of REACH.

12.6. Endocrine disrupting properties

The substance does not contain components with known endocrine disrupting properties with effects on the environment.

12.7 Other adverse effects

Not known.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not dump on the ground or in sewers, tunnels or waterways.

For the disposal of waste deriving from the product, including empty containers not reclaimed, comply with the local regulation. European Waste Catalogue Code: 13 07 03* The code indicated is only a general indication, based on the original composition of the product and the intended uses. The user (producer of the waste) is responsible for choosing the most appropriate code based on the actual use of the product, any alterations and contaminations). The product as such does not contain halogenated compounds. Disposal of containers: Do not disperse containers in the environment. Dispose of according to local regulations. Do not drill, cut, grind, weld, braze, burn or incinerate unclaimed empty containers or drums.

SECTION 14. TRANSPORT INFORMATION

14.1 UN number or ID Number

ADR/RID/ADN: 1202

IATA/IMDG: 3082

14.2 UN proper shipping name

GAS OIL or DIESEL FUEL or HEATING OIL LIGHT

IATA / IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

14.3 Transport hazard class(es)

Road/railway transport (RID/ADR/ADN):

Class:	3
Danger code:	F1
Label:	3
Hazard Identification Number:	30
Tunnel restrictions code:	D/E

Sea transport (IMDG)

Class:	9
	Note: flash point up to 60°C

Air transport (IATA):

Class:	9
	Note: flash point up to 60°C

14.4 Packing group

III

14.5 Environmental hazards

Substance is hazardous to the environment under the code ADR, RID, ADN e IMDG.

14.6 Special precautions for users

Wear gloves (tested to EN374) if hand contact with substance likely. Refer to section 7 of the SDS "Handling and Storage"

14.7 Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15. REGULATORY INFORMATION

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

- Title VII Authorization pursuant to reach Regulation (EC Reg. no. 1907/2006): substance not subject to authorization
- Title VIII Restrictions pursuant to reach Regulation (EC Reg. no. 1907/2006): item 3 Annex XVII: dangerous liquid substances/mixtures.

Other EU legislation and national transpositions:

- Category Seveso (Dir. 2012/18/UE) :
  Annex 1, Part 1:
  category P5c - Flammable liquids
  category E2 - Dangerous for the aquatic environment category of chronic toxicity 2
  Annex 1 part 2:
  category 34 - Petroleum products and alternative fuels
- Dir. 98/24/EC: Hazardous chemical agent
- Dir. 97/42/EC and 99/38/EC: not applicable as it is not carcinogenic

15.2 Chemical safety assessment

A chemical safety assessment has been carried out. See Annex I.

SECTION 16. OTHER INFORMATION

List of relevant hazard statements and notes:

H226: Flammable liquid and vapour
H304: May be fatal if swallowed and enters airways
H332: Harmful if inhaled
H373: May cause damage to organs through prolonged or repeated exposure
H411: Toxic to aquatic life with long lasting effects
EUH066: Repeated exposure may cause skin dryness or cracking

Indications on training:

Adequate training of workers potentially exposed to this substance on the basis of the contents of this safety data sheet.

Main bibliographic references and data sources:

Registration Dossier

CSR 2016, CSR 2017, CSR 2018, CSR 2019, CSR 2020, CSR 2021, CSR 2022

Legend of abbreviations and acronyms:

ACGIH = American Conference of Governmental Industrial Hygienists
CSR = Chemical Safety Report
EC50 = Median effective concentration
IC50 = Inhibition concentration, 50%
Klimisch=Evaluation criterion for reliability of the method used.
LC50 = Lethal concentration, 50%
LD50 = Mean Lethal Dose
PBT = Persistent, Bioaccumulative and Toxic Substance
s.m.i: = Subsequent Modifications and Additions
CNS=Central nervous system
STOT = Specific target organ toxicity
(STOT) RE = Repeated exposure
(STOT) SE = Single exposure
Key Study=Study of greater relevance
TLVTWA®= Threshold limit value – time-weighted average
TLVSTEL®= Threshold limit value – limit for short exposure time
UVCB=substances of Unknown or Variable composition
vPvB = very Persistent and very Bioaccumulative

Compilation date 29/11/2010

Revision date 01/10/2014

Reason for Rev00 of 01/10/2014: Update pursuant to Annex I of EU Regulation 453/2010, of the CLP EC Regulation 1272/2008 including the 4th ATP (Adaptations to Technical Progress) provided for substances from 1.12.14, of regulation DSD 7/548 / EEC) including the 31st ATP.

Revision date 04/05/2015

Reason for Rev.A of 04/05/2015: Update of emergency telephone numbers. Upgrade to the 5th ATP

Revision date 21/12/2015

Reason for Rev.B of 21/12/2015: Update of the following sections: 2, 8, 11, 14, 15, 16 and exposure scenarios

Revision date 14/07/2016

Reason for Rev.C of 14/07/2016: Update of the following sections: 1, 8, 16 some exposure scenarios are removed and new scenarios for professional use and consumers are introduced

Revision date 05/11/2018

Reason for Rev.D of 05/11/2018: Update of the following sections: 1, 16 and exposure scenarios.

Revision date 20/12/2019

Reason for Rev.E of 20/12/2019: Update of the following sections: 8 (changes to DNELs), 9 (inserted values calculated for solubility and Log-Pow), 11 (Changes to the end-point mutagenicity, for insertion of new Ames Test), 12 (inserted

values calculated for biodegradation, bioaccumulation and mobility in the soil) and Exposure scenarios for the environmental part.

Revision date 20/04/2020

Reason for Rev. F of 20/04/2020: Update of the format of the safety data sheet (all sections.) Update of section 8 (replacement of pictograms in accordance with UNI EN 7010 Safety Signs 201.

Revision date20/11/2020

Reason for Rev.G of 20/11/2020: Update of sections 1 (uses), 14 (removed section 14. and 16 (added bibliographic source) and exposure scenarios as per CSR 2020.

Revision date: 31/03/2022

Reason for Rev. H of 31/03/2022: Update of the SDS model according to Reg. (EU) 2020/878. Updating the content of sections 1, 2, 4, 5, 6, 7, 8,11, 12, 16. Update of exposure scenarios as per CSR 2021.

Revision date: 23/12/2022

Reason for Rev I of 23/01/2023: Update of the SDS in according to Chemical Safety Report 2022 and update of exposure scenarios, reported information for the management of the risk of presence of H_2S.

ANNEX 1

EXPOSURE SCENARIOS
STRAIGHT RUN GAS OIL

Identified uses	Life Cycle	Field of use (SU)	Product Category (PC)	Process Category(PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
01 - Manufacture of substance	Manufacture	n.a	n.a.	1, 2, 3, 4, 8a, 8b, 9, 15, 28	1	ESVOC SpERC 1.1.v1
02 - Formulation and (re)packaging of substances and mixtures	Formulation	n.a.	n.a.	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 28	2	ESVOC SpERC 2.2.v1
01b - Use as an intermediate	Industrial	8, 9	n.a.	1, 2, 3, 4, 8a, 8b, 9, 15, 28	6th	ESVOC SpERC 6.1a.v1
05a - Use in oil and gas field drilling and production operations; Industrial	industrial	n.a.	n.a.	1, 2, 3, 4, 8a, 8b, 9, 28	4	qualitative assessment for the environment
12a - Use in fuel	Industrial	n.a.	n.a.	1, 2, 8a, 8b, 16, 28	7	ESVOC SpERC 7.12a.v1
12b - Use in fuel	Professional	n.a.	n.a.	1, 2, 8a, 8b, 16, 28	9a, 9b	ESVOC SpERC 9.12b.v1
12c - Use in fuel	Consumers	13	n.a.	n.a.	9a, 9b	ESVOC SpERC 9.12c.v1

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01 - Manufacture of substance

Section 1	
Title	
01 - Manufacture of substance	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15, 28
Environmental Release Categories	1
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
General exposures; Closed systems (PROC_1)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Assumes process temperature up to 800.0 °C [ESCom-12355002161] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Closed systems (PROC_2)	Provide extract ventilation to points where emissions occur. [ESCom-11133171412] Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Assumes process temperature up to 800.0 °C [ESCom-12355002161] Additional good practice advice. Obligations according to Article 37(4) of REACH do

	not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Closed systems (PROC_3)	Provide extract ventilation to points where emissions occur. [ESCom-11133171412] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [ESCom-11133171363] Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Assumes process temperature up to 800.0 °C [ESCom-12355002161] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Open systems (PROC_4)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Process sampling (PROC_9)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Laboratory activities (PROC_15)	No other specific measures identified. [ESCom-11133171454] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use. [ESCom-9267230301] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Bulk transfers; Closed systems (PROC_8b)	Handle substance within a closed system. [ESCom-11133171405] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply.

	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Bulk transfers; Open systems (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,6
Regional use tonnage (tonnes/year)	3,5E+06
Fraction of Regional tonnage used locally	1,0E+00
Annual site tonnage (tonnes/year)	3,5E+06
Maximum daily site tonnage (kg/day)	1,2E+07
Frequency and duration of use	
Continuous release. [ESCom-10133212701]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	

Release fraction to air from process (initial release prior to RMM)	1,0E-03
Release fraction to wastewater from process (initial release prior to RMM)	3,0E-07
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [ESCom-10133220229]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [ESCom-10133221223]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9,0E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	90,4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [ESCom-10133221228] Sludge should be incinerated, contained or reclaimed. [ESCom-10133221229]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,5E+07
Assumed domestic sewage treatment plant flow (m3/d)	1,0E+04
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated. [ESCom-10133222904]	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated. [ESCom-10133222904]	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]	

Worker CS 1: General exposures; Closed systems (PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	Final RCR < 0.01
Inhalation, systemic, acute	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	Final RCR < 0.01

Combined routes, systemic, long-term			Final RCR < 0.01
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 2: General exposures; Closed systems (PROC 2)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour >10.000 Pa	8.771 mg/m³ (TRA Workers) RCR = 0.535	Final RCR = 0.535
Inhalation, systemic, acute	Vapour >10.000 Pa	35.08 mg/m³ (TRA Workers) RCR = 0.023	Final RCR = 0.023
Combined routes, systemic, long-term			Final RCR = 0.535
Combined routes, systemic, acute			Final RCR = 0.023

Worker CS 3: General exposures; Closed systems (PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour >10.000 Pa	12.28 mg/m³ (TRA Workers) RCR = 0.749	Final RCR = 0.749
Inhalation, systemic, acute	Vapour >10.000 Pa	49.12 mg/m³ (TRA Workers) RCR = 0.033	Final RCR = 0.033
Combined routes, systemic, long-term			Final RCR = 0.749
Combined routes, systemic, acute			Final RCR = 0.033

Worker CS 4: General exposures; Open systems (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.398
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.017
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.87
Combined routes, systemic, acute			Final RCR = 0.017

Worker CS 5: Process sampling (PROC 9)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.433
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.28E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.019
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.281 mg/m³ (TRA Workers) RCR = 1.87E-4	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.905
Combined routes, systemic, acute			Final RCR = 0.019

Worker CS 6: Laboratory activities (PROC 15)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.48 mg/m³ (TRA Workers) RCR = 0.029	Final RCR = 0.123
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 1.28E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Combined routes, systemic, long-term			Final RCR = 0.24
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 7: Bulk transfers; Closed systems (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic,	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.112

long term			
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.583
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 8: Bulk transfers; Open systems (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 9: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	Final RCR = 0.224
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic,	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	Final RCR < 0.01

acute			
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.695
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 10: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [ESCom-10133223601] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [ESCom-10133223602] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [ESCom-10133223603]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	5,5E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	7,8E-01

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

Section 1	
Title	
02 - Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 28
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
General exposures; Closed systems (PROC_2, PROC_1, PROC_3)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Open systems (PROC_4)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear

	suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Batch process; Elevated temperature; Use in contained systems (PROC_3)	Provide extract ventilation to points where emissions occur. [ESCom-11133171412] Handle substance within a closed system. [ESCom-11133171405] Assumes process temperature up to 60.0 °C [ESCom-12355002161] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Process sampling (PROC_9)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Laboratory activities (PROC_15)	No other specific measures identified. [ESCom-11133171454] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use. [ESCom-9267230301] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Bulk transfers; Dedicated facility (PROC_8b)	Handle substance within a closed system. [ESCom-11133171405] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Mixing operations; Open systems (PROC_5)	Provide extract ventilation to points where emissions occur. [ESCom-11133171412] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear

	suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Manual; Transfer from/pouring from containers; Non-dedicated facility (PROC_8a)	Use drum pumps. [ESCom-11133171411] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drum/batch transfers; Dedicated facility (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Tabletting, compression, extrusion or pelletisation (PROC_14)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drum and small package filling (PROC_9)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further

	specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	6,6E+04
Fraction of Regional tonnage used locally	4,5E-01
Annual site tonnage (tonnes/year)	3,0E+04
Maximum daily site tonnage (kg/day)	1,0E+05
Frequency and duration of use	
Continuous release. [ESCom-10133212701]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM)	8,0E-06
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [ESCom-10133220229]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [ESCom-10133221223]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	0,0E+00
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	91,6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [ESCom-10133221228] Sludge should be incinerated, contained or reclaimed. [ESCom-10133221229]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,1E+05
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03

Conditions and measures related to external treatment of waste for disposal

External treatment and disposal of waste should comply with applicable local and/or national regulations. [ESCom-10133222903]

Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable local and/or national regulations. [ESCom-10133223500]

Section 3 Exposure Estimation

3.1. Health

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

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]

Worker CS 1: General exposures; Closed systems (PROC 2, PROC1; PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 2: General exposures; Open systems (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.398
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.017
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.87
Combined routes, systemic, acute			Final RCR = 0.017

Worker CS 3: Batch process; Elevated temperature; Use in contained systems (PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.326 mg/m³ (TRA Workers) RCR = 0.02	Final RCR = 0.025
	Vapour 500-10.000 Pa	0.072 mg/m³ (TRA Workers) RCR = 4.4E-3	
	Vapour >10.000 Pa	0.012 mg/m³ (TRA Workers) RCR = 7.49E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.305 mg/m³ (TRA Workers) RCR = 8.7E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.288 mg/m³ (TRA Workers) RCR = 1.92E-4	
	Vapour >10.000 Pa	0.049 mg/m³ (TRA Workers) RCR = 3.27E-5	
Combined routes, systemic, long-term			Final RCR = 0.025
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 4: Process sampling (PROC 9)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.433
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	

	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.28E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.019
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.281 mg/m³ (TRA Workers) RCR = 1.87E-4	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.905
Combined routes, systemic, acute			Final RCR = 0.019

Worker CS 5: Laboratory activities (PROC 15)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.48 mg/m³ (TRA Workers) RCR = 0.029	Final RCR = 0.123
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 1.28E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Combined routes, systemic, long-term			Final RCR = 0.24
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 6: Bulk transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.112
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	

	Pa		
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.583
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 7: Mixing operations; Open systems (PROC 5)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.48 mg/m³ (TRA Workers) RCR = 0.029	Final RCR = 0.043
	Vapour 10-500 Pa	0.134 mg/m³ (TRA Workers) RCR = 8.16E-3	
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 1.28E-3	Final RCR < 0.01
	Vapour 10-500 Pa	0.535 mg/m³ (TRA Workers) RCR = 3.57E-4	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.515
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 8: Manual; Transfer from/pouring from containers; Non-dedicated facility (PROC 8a)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.48 mg/m³ (TRA Workers) RCR = 0.029	Final RCR = 0.052
	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 1.28E-3	Final RCR < 0.01
	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	

Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.523
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 9: Drum/batch transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 10: Tabletting, compression, extrusion or pelletisation (PROC 14)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.142
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	0.686 mg/kg bw/day (TRA Workers) RCR = 0.236	Final RCR = 0.236
Combined routes, systemic, long-term			Final RCR = 0.378
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 11: Drum and small package filling (PROC 9)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.433
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.28E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.019
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.281 mg/m³ (TRA Workers) RCR = 1.87E-4	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.905
Combined routes, systemic, acute			Final RCR = 0.019

Worker CS 12: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	Final RCR = 0.224
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.695
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 13: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	

	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [ESCom-10133223601] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [ESCom-10133223602] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [ESCom-10133223603]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	2,4E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	8,8E-01

01b - Use as an intermediate

Section 1	
Title	
01b - Use as an intermediate	
Use Descriptor	
Sector(s) of Use	8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15, 28
Environmental Release Categories	6a
Specific Environmental Release Category	ESVOC SpERC 6.1a. v1
Processes, tasks, activities covered	
Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
General exposures; Closed systems (PROC_2, PROC_1, PROC_3)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Open systems (PROC_4)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear

	suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Process sampling (PROC_9)	Wear suitable gloves tested to EN374. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-10133224896 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Laboratory activities (PROC_15)	No other specific measures identified. [ESCom-11133171454] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Put lids on containers immediately after use. [ESCom-9267230301] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Bulk transfers; Closed systems (PROC_8b)	Handle substance within a closed system. [ESCom-11133171405] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Bulk transfers; Open systems (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply.

	Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	6,0E+05
Fraction of Regional tonnage used locally	2,5E-02
Annual site tonnage (tonnes/year)	1,5E+04
Maximum daily site tonnage (kg/day)	5,0E+04
Frequency and duration of use	
Continuous release. [ESCom-10133212701]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM)	1,5E-05
Release fraction to soil from process (initial release prior to RMM)	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [ESCom-10133220229]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [ESCom-10133221223]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	8,0E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	91,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [ESCom-10133221228] Sludge should be incinerated, contained or reclaimed. [ESCom-10133221229]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6,0E+04

Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03

Conditions and measures related to external treatment of waste for disposal

This substance is consumed during use and no waste of the substance is generated. [ESCom-10133223502]

Conditions and measures related to external recovery of waste

This substance is consumed during use and no waste of the substance is generated. [ESCom-10133223502]

Section 3 Exposure Estimation

3.1. Health

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

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]

Worker CS 1: General exposures; Closed systems (PROC 2, PROC 1; PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 2: General exposures; Open systems (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.398
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	

	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.017
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.87
Combined routes, systemic, acute			Final RCR = 0.017

Worker CS 3: Process sampling (PROC 9)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.433
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.28E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.019
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.281 mg/m³ (TRA Workers) RCR = 1.87E-4	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Combined routes, systemic, long-term			Final RCR = 0.905
Combined routes, systemic, acute			Final RCR = 0.019

Worker CS 4: Laboratory activities (PROC 15)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.48 mg/m³ (TRA Workers) RCR = 0.029	Final RCR = 0.123
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 1.28E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	

Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Combined routes, systemic, long-term			Final RCR = 0.24
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 5: Bulk transfers; Closed systems (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.112
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.583
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 6: Bulk transfers; Open systems (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 7: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	Final RCR = 0.224
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.695
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 8: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [ESCom-10133223601] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [ESCom-10133223602] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [ESCom-10133223603]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	9,9E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	8,3E-01

05a - Use in oil and gas field drilling and production operations; Industrial

Section 1	
Title	
05a - Use in oil and gas field drilling and production operations; Industrial	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 28
Environmental Release Categories	4
Specific Environmental Release Category	QUALITATIVE ASSESSMENT FOR ENVIRONMENT
Processes, tasks, activities covered	
Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
Bulk transfers; Dedicated facility (PROC_8b)	Handle substance within a closed system. [ESCom-11133171405] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Filling of equipment from drums or containers; Dedicated facility (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drilling mud (re-)formulation; Use in contained batch processes (PROC_3)	Handle substance within a closed system. [ESCom-11133171405] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drill floor operations (PROC_4)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Operation of solids filtering equipment; Elevated temperature (PROC_4)	Provide the operation with a properly sited receiving hood. [ESCom-11133171427] Assumes process temperature up to 60.0 °C [ESCom-12355002161] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Cleaning of solids filtering equipment; Non-dedicated facility (PROC_8a)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Treatment and disposal of filtered solids; Use in contained systems (PROC_3)	Handle substance within a closed system. [ESCom-11133171405] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Process sampling (PROC_9)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Closed systems (PROC_2, PROC_1)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Pouring from small containers; Non-dedicated facility (PROC_8a)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Open systems (PROC_4)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected

	with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	1,0
Regional use tonnage (tonnes/year)	1,7E+04
Fraction of Regional tonnage used locally	N/A
Annual site tonnage (tonnes/year)	N/A
Maximum daily site tonnage (kg/day)	N/A
Frequency and duration of use	
Emission days (days/year)	N/A
Environmental factors not influenced by risk management	
Local freshwater dilution factor	N/A
Local marine water dilution factor	N/A
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	N/A
Release fraction to wastewater from process (initial release prior to RMM)	N/A
Technical conditions and measures at process level (source) to prevent release	
Discharge to aquatic environment is restricted (see Section 4.2.). [ESCom-10133220230]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	N/A

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	N/A
Organisation measures to prevent/limit release from site	
Prevent environmental discharge consistent with regulatory requirements. [ESCom-10133221230]	
Conditions and measures related to municipal sewage treatment plant	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	N/A
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	N/A
Assumed domestic sewage treatment plant flow (m3/d)	N/A
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ESCom-10133222903] Cuttings and process water are disposed according to local and/or national regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ESCom-10133223500] Cuttings and process water are re-injected according to local and/or national regulations.	

Section 3 Exposure Estimation

3.1. Health

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

3.2. Environment

Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. [ESCom-10133223509] Qualitative approach used to conclude safe use. [ESCom-10133223510]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]

Worker CS 1: Bulk transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.112
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	

	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.583
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 2: Filling of equipment from drums or containers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 3: Drilling mud (re-)formulation; Use in contained batch processes (PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.803 mg/m³ (TRA Workers) RCR = 0.049	Final RCR = 0.061
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	3.213 mg/m³ (TRA Workers) RCR = 2.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	0.69 mg/kg bw/day (TRA Workers) RCR = 0.237	Final RCR = 0.237
Combined routes, systemic, long-term			Final RCR = 0.298

Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 4: Drill floor operations (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.398
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.017
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	0.686 mg/kg bw/day (TRA Workers) RCR = 0.236	Final RCR = 0.236
Combined routes, systemic, long-term			Final RCR = 0.634
Combined routes, systemic, acute			Final RCR = 0.017

Worker CS 5: Operation of solids filtering equipment; Elevated temperature (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.418 mg/m³ (TRA Workers) RCR = 0.025	Final RCR = 0.069
	Vapour 10-500 Pa	0.544 mg/m³ (TRA Workers) RCR = 0.033	
	Vapour 500-10.000	0.144 mg/m³ (TRA Workers)	
	Pa	RCR = 8.79E-3	
	Vapour >10.000 Pa	0.025 mg/m³ (TRA Workers) RCR = 1.5E-3	
Inhalation, systemic, acute	Aerosol	1.671 mg/m³ (TRA Workers) RCR = 1.11E-3	Final RCR < 0.01
	Vapour 10-500 Pa	2.176 mg/m³ (TRA Workers) RCR = 1.45E-3	
	Vapour 500-10.000 Pa	0.577 mg/m³ (TRA Workers) RCR = 3.84E-4	
	Vapour >10.000 Pa	0.098 mg/m³ (TRA Workers) RCR = 6.55E-5	
Combined routes, systemic, long-term			Final RCR = 0.069
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 6: Cleaning of solids filtering equipment; Non-dedicated facility (PROC 8a)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification

Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.516
	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.023
	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.987
Combined routes, systemic, acute			Final RCR = 0.023

Worker CS 7: Treatment and disposal of filtered solids; Use in contained systems (PROC 3)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.803 mg/m³ (TRA Workers) RCR = 0.049	Final RCR = 0.061
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	3.213 mg/m³ (TRA Workers) RCR = 2.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	0.69 mg/kg bw/day (TRA Workers) RCR = 0.237	Final RCR = 0.237
Combined routes, systemic, long-term			Final RCR = 0.298
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 8: Process sampling (PROC 9)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.433
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.28E-3	

Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.019
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.281 mg/m³ (TRA Workers) RCR = 1.87E-4	
Dermal, systemic, long term	Dermal	0.686 mg/kg bw/day (TRA Workers) RCR = 0.236	Final RCR = 0.236
Combined routes, systemic, long-term			Final RCR = 0.669
Combined routes, systemic, acute			Final RCR = 0.019

Worker CS 9: General exposures; Closed systems (PROC 2, PROC1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 10: Pouring from small containers; Non-dedicated facility (PROC 8a)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.516
	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.023
	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	
	Vapour 500-10.000	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	

	Pa		
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.987
Combined routes, systemic, acute			Final RCR = 0.023

Worker CS 11: General exposures; Open systems (PROC 4)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.398
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.017
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	0.686 mg/kg bw/day (TRA Workers) RCR = 0.236	Final RCR = 0.236
Combined routes, systemic, long-term			Final RCR = 0.634
Combined routes, systemic, acute			Final RCR = 0.017

Worker CS 12: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	Final RCR = 0.224
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.695
Combined routes,			Final RCR < 0.01

systemic, acute			

Worker CS 13: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Offshore drilling: Discharge to aquatic environment is restricted by law and industry prohibits release. [ESCom-10133223608] OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007.

Onshore drilling: Environmental releases are minimized during onshore drilling operations; waste recycling and disposal is managed according to national and/or local regulations. International Finance Corporation 2007. Environmental, Health, and Safety Guidelines: onshore oil and gas development. Mining Waste Directive (2006/21/EC), European Waste Directive (2008/98/EC) and national transpositions, e.g. Novelle des Kreislaufwirtschaftsgesetzes (KrWG) in Germany.

12a - Use in fuel; Industrial

Section 1	
Title	
12a - Use in fuel; Industrial	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 8a, 8b, 16, 28
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 7. 12a.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
Bulk transfers; Dedicated facility (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drum/batch transfers; Dedicated facility (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-

	17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Closed systems (PROC_2, PROC_1)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Use of fuels; Closed systems (PROC_16)	Handle substance within a closed system. [ESCom-11133171405] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	4,7E+04
Fraction of Regional tonnage used locally	1,0E+00
Annual site tonnage (tonnes/year)	4,7E+04
Maximum daily site tonnage (kg/day)	1,6E+05
Frequency and duration of use	

Continuous release. [ESCom-10133212701]	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM)	5,0E-06
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [ESCom-10133220229]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment. [TCR1b]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9,5E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	91,3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [ESCom-10133221228] Sludge should be incinerated, contained or reclaimed. [ESCom-10133221229]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,8E+05
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. [ESCom-10133222901] Combustion emissions considered in regional exposure assessment. [ESCom-10133222902] External treatment and disposal of waste should comply with applicable local and/or national regulations. [ESCom-10133222903]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ESCom-10133223502]	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]	

Worker CS 1: Bulk transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 2: Drum/batch transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.171
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.451 mg/m³ (TRA Workers) RCR = 0.027	
	Vapour >10.000 Pa	0.053 mg/m³ (TRA Workers) RCR = 3.21E-3	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.802 mg/m³ (TRA Workers) RCR = 1.2E-3	
	Vapour >10.000 Pa	0.211 mg/m³ (TRA Workers) RCR = 1.4E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.642
Combined routes, systemic, acute			Final RCR < 0.01

General exposures; Closed systems (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 4: Use of fuels; Closed systems (PROC 16)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Combined routes, systemic, long-term			Final RCR = 0.139
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 5: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	Final RCR = 0.224
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	

Inhalation, systemic, acute	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.695
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 6: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.022
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.493
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [ESCom-10133223601] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [ESCom-10133223602] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [ESCom-10133223603]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	1,8E-03
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	8,6E-01

12b - Use in fuel; Professional

Section 1	
Title	
12b - Use in fuel; Professional	
Use Descriptor	
Sector(s) of Use	
Process Categories	1, 2, 8a, 8b, 16, 28
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure With potential for aerosol generation [ESCom-11133171333 ESCom-11133171301]
Concentration of substance in product	Covers percentage substance in the product up to 100 %. (unless stated differently) [ESCom-11133171310 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [ESCom-11133171304 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Other Operational Conditions affecting exposure	Assumes a good basic standard of occupational hygiene is implemented [ESCom-11133171303] Covers use at ambient temperatures. (unless stated differently) [ESCom-10133224959 ESCom-18309152101 ESCom-16173221408 ESCom-18309152200]
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
Bulk transfers; Dedicated facility (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Drum/batch transfers; Dedicated facility (PROC_8b)	Use drum pumps. [ESCom-11133171411] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further

	specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Refuelling (PROC_8b)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Ensure no splashing occurs during transfer. [ESCom-16173221409] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
General exposures; Closed systems (PROC_2, PROC_1)	Handle substance within a closed system. [ESCom-11133171405] Sample via a closed loop or other system to avoid exposure. [ESCom-11133171361] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Use of fuels; Closed systems (PROC_16)	Handle substance within a closed system. [ESCom-11133171405] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Equipment cleaning and maintenance (PROC_8a, PROC_28)	Drain down and flush system prior to equipment break-in or maintenance. [ESCom-11133171413] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands. For further specification, refer to section 8 of the SDS. [ESCom-11133171457 ESCom-17297180800 ESCom-12355002165] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. Wear suitable coveralls to prevent exposure to the skin. [ESCom-11133171468] Clear spills immediately. [ESCom-9267230103] If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]
Storage (PROC_2, PROC_1)	Store substance within a closed system. [ESCom-11133171437] Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply. If repeated and/or prolonged skin exposure to the substance is likely, then wear

	suitable gloves tested to EN374. Provide employee with skin care programmes. [ESCom-16354145601 ESCom-15193135615]

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	3,2E+03
Fraction of Regional tonnage used locally	5,0E-04
Annual site tonnage (tonnes/year)	1,6E+00
Maximum daily site tonnage (kg/day)	4,4E+00
Frequency and duration of use	
Continuous release. [ESCom-10133212701]	
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	
Release fraction to air from wide dispersive use (regional use only)	5,0E-03
Release fraction to wastewater from wide dispersive use	1,0E-06
Release fraction to soil from wide dispersive use (regional use only)	0.00025
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used. [ESCom-10133220229]	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater. [TCR1a]	
No wastewater treatment required [TCR6]	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency >= (%)	0,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. [ESCom-10133221228] Sludge should be incinerated, contained or reclaimed. [ESCom-10133221229]	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,5E+03
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. [ESCom-10133222901] Combustion emissions considered in regional exposure assessment. [ESCom-10133222902] External treatment and disposal of waste should comply with applicable local and/or national regulations. [ESCom-10133222903]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ESCom-10133223502]	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-10133224709; ESCom-16354132600; ESCom-11133171322]

Worker CS 1: Bulk transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.516
	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.023
	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.987
Combined routes, systemic, acute			Final RCR = 0.023

Worker CS 2: Drum/batch transfers; Dedicated facility (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0.96 mg/m³ (TRA Workers) RCR = 0.059	Final RCR = 0.081
	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	
	Vapour 500-10.000 Pa	0.09 mg/m³ (TRA Workers) RCR = 5.49E-3	
	Vapour >10.000 Pa	8.77E-3 mg/m³ (TRA Workers) RCR = 5.35E-4	
Inhalation, systemic, acute	Aerosol	3.838 mg/m³ (TRA Workers) RCR = 2.56E-3	Final RCR < 0.01
	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	
	Vapour 500-10.000	0.36 mg/m³ (TRA Workers) RCR = 2.4E-4	

	Pa		
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.34E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.552
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 3: Refuelling (PROC 8b)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	4.798 mg/m³ (TRA Workers) RCR = 0.293	Final RCR = 0.516
	Vapour 10-500 Pa	2.678 mg/m³ (TRA Workers) RCR = 0.163	
	Vapour 500-10.000 Pa	0.901 mg/m³ (TRA Workers) RCR = 0.055	
	Vapour >10.000 Pa	0.088 mg/m³ (TRA Workers) RCR = 5.35E-3	
Inhalation, systemic, acute	Aerosol	19.19 mg/m³ (TRA Workers) RCR = 0.013	Final RCR = 0.023
	Vapour 10-500 Pa	10.71 mg/m³ (TRA Workers) RCR = 7.14E-3	
	Vapour 500-10.000 Pa	3.604 mg/m³ (TRA Workers) RCR = 2.4E-3	
	Vapour >10.000 Pa	0.351 mg/m³ (TRA Workers) RCR = 2.34E-4	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.987
Combined routes, systemic, acute			Final RCR = 0.023

Worker CS 4: General exposures; Closed systems (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.105
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.576

Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 5: Use of fuels; Closed systems (PROC 16)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.268 mg/m³ (TRA Workers) RCR = 0.016	Final RCR = 0.028
	Vapour 500-10.000 Pa	0.18 mg/m³ (TRA Workers) RCR = 0.011	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	1.071 mg/m³ (TRA Workers) RCR = 7.14E-4	Final RCR < 0.01
	Vapour 500-10.000 Pa	0.721 mg/m³ (TRA Workers) RCR = 4.8E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Combined routes, systemic, long-term			Final RCR = 0.145
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 6: Equipment cleaning and maintenance (PROC 8a, PROC 28)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	1.919 mg/m³ (TRA Workers) RCR = 0.117	Final RCR = 0.223
	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.035 mg/m³ (TRA Workers) RCR = 2.14E-3	
Inhalation, systemic, acute	Aerosol	7.677 mg/m³ (TRA Workers) RCR = 5.12E-3	Final RCR < 0.01
	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.14 mg/m³ (TRA Workers) RCR = 9.35E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.694
Combined routes, systemic, acute			Final RCR < 0.01

Worker CS 7: Storage (PROC 2, PROC 1)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification

Inhalation, systemic, long term	Vapour 10-500 Pa	1.339 mg/m³ (TRA Workers) RCR = 0.082	Final RCR = 0.105
	Vapour 500-10.000 Pa	0.36 mg/m³ (TRA Workers) RCR = 0.022	
	Vapour >10.000 Pa	0.018 mg/m³ (TRA Workers) RCR = 1.07E-3	
Inhalation, systemic, acute	Vapour 10-500 Pa	5.355 mg/m³ (TRA Workers) RCR = 3.57E-3	Final RCR < 0.01
	Vapour 500-10.000 Pa	1.442 mg/m³ (TRA Workers) RCR = 9.61E-4	
	Vapour >10.000 Pa	0.07 mg/m³ (TRA Workers) RCR = 4.68E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Combined routes, systemic, long-term			Final RCR = 0.576
Combined routes, systemic, acute			Final RCR < 0.01

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600] Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. [ESCom-10133223601] Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [ESCom-10133223602] Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [ESCom-10133223603]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	1,5E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2,9E-03

12c - Use in fuel; Consumer

Section 1	
Title	
12c - Use in fuel; Consumer	
Use Descriptor	
Sector(s) of Use	
Product Categories	13
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12c.v1
Processes, tasks, activities covered	
Covers consumer uses in liquid fuels	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of consumer exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	-
Concentration of substance in product	Covers concentrations up to 100.0 % [ESCom-11133171519]
Frequency and duration of use/exposure	Covers use up to 1.0 events per day [ESCom-11133171521]
Other Operational Conditions affecting exposure	-
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) [ESCom-10133224705]	Avoid using without gloves. [ESCom-10133224705 ESCom-10133224966]
General measures (flammability) [ESCom-19350151900]	applicable if classified as H224 or H225 or H226, refer to section 2 of the SDS; For measures to control risks from physicochemical properties, refer to main body of the SDS, section 7 and/or 8. []
General measures (aspiration hazard)	applicable if classified as H304, refer to section 2 of the SDS; Do not ingest. If swallowed then seek immediate medical assistance. []
Fuels; Liquid; Automotive refuelling; (; Diesel;) (PC_13) Based on Concawe_SCED_13_3_a	For each use event, covers use amounts up to 44000.0 g/event [ESCom-11133171520] Exposure duration = 0.05 h/event [ESCom-11133170461] Outdoor use [ESCom-9313213238] Assumes that potential dermal contact is limited to palm of one hand []
Fuels; Liquid; Recreational vehicles; (; Quad bikes or similar;) (PC_13) Based on Concawe_SCED_13_7_a	For each use event, covers use amounts up to 7500.0 g/event [ESCom-11133171520] Exposure duration = 0.017 h/event [ESCom-11133170461] Outdoor use [ESCom-9313213238] Assumes that potential dermal contact is limited to palm of one hand []
Fuels; Liquid; Garden equipment (PC_13) Based on Concawe_SCED_13_4_a	For each use event, covers use amounts up to 750.0 g/event [ESCom-11133171520] Exposure duration = 0.033 h/event [ESCom-11133170461] Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands. [ESCom-12355002181]
Section 2.2 Control of environmental exposure	
Product characteristics	

Substance is complex UVCB. [ESCom-11133171600] Predominantly hydrophobic. [ESCom-11133171601]	
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	1,4E+04
Fraction of Regional tonnage used locally	5,0E-04
Annual site tonnage (tonnes/year)	7,2E+00
Maximum daily site tonnage (kg/day)	2,0E+01
Frequency and duration of use	
Continuous release. [ESCom-10133212701]	
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	
Release fraction to air from wide dispersive use (regional use only)	1,0E-04
Release fraction to wastewater from wide dispersive use	2,0E-07
Release fraction to soil from wide dispersive use (regional use only)	0.00005
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater. [ESCom-10133222100]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	92,5
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6,9E+03
Assumed domestic sewage treatment plant flow (m3/d)	2,0E+03
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. [ESCom-10133222901] Combustion emissions considered in regional exposure assessment. [ESCom-10133222902] External treatment and disposal of waste should comply with applicable local and/or national regulations. [ESCom-10133222903]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ESCom-10133223502]	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model. [ESCom-11133171701]	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.; Available hazard data do not enable the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation. [ESCom-11133171315; ESCom-16354132600; ESCom-11133171322]	

Cons CS 1: Fuels; Liquid; Automotive refuelling; (; Diesel;) (PC 13)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.222 mg/m³ (TRA Consumers) RCR = 0.046	Final RCR = 0.046
Inhalation, systemic, acute	Vapour 10-500 Pa	106.6 mg/m³ (ECETOC TRA Consumers 3.1) RCR = 0.118	Final RCR = 0.118

Dermal, systemic, long term	Dermal	0.175 mg/kg bw/day (TRA Consumers) RCR = 0.14	Final RCR = 0.14
Oral, systemic, long term	Dermal	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.186
Combined routes, systemic, acute			Final RCR = 0.118

Cons CS 2: Fuels; Liquid; Recreational vehicles; (; Quad bikes or similar;) (PC 13)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.068 mg/m³ (TRA Consumers) RCR = 0.014	Final RCR = 0.014
Inhalation, systemic, acute	Vapour 10-500 Pa	98.12 mg/m³ (ECETOC TRA Consumers 3.1) RCR = 0.109	Final RCR = 0.109
Dermal, systemic, long term	Dermal	0.35 mg/kg bw/day (TRA Consumers) RCR = 0.28	Final RCR = 0.28
Oral, systemic, long term	Dermal	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.294
Combined routes, systemic, acute			Final RCR = 0.109

Cons CS 3: Fuels; Liquid; Garden equipment (PC 13)

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 10-500 Pa	0.209 mg/m³ (TRA Consumers) RCR = 0.043	Final RCR = 0.043
Inhalation, systemic, acute	Vapour 10-500 Pa	150.4 mg/m³ (ECETOC TRA Consumers 3.1) RCR = 0.167	Final RCR = 0.167
Dermal, systemic, long term	Dermal	0.071 mg/kg bw/day (TRA Consumers) RCR = 0.057	Final RCR = 0.057
Oral, systemic, long term	Dermal	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.1
Combined routes, systemic, acute			Final RCR = 0.167

4.2. Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. [ESCom-10133223600]

Maximum Risk Characterisation Ratio for Air Emissions RCRair	1,5E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2,9E-03