Material Safety Data Sheet

According to Regulation (EC) n. 1907/2006 and subsequent amendments thereto

KEROSINE

Q8 Quaser s.r.l.

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

1.1 Product identifier

Product name:	KEROSINE
Synonym:	Kerosine (all type)
CAS Number:	not applicable (mixture)
EC Number:	not applicable (mixture)
Index Number:	not applicable (mixture)
REACh Registration Number:	not applicable (mixture)

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

COMMON USE: heating fuel and other industrial uses

IDENTIFIED USES IN THE CHEMICAL SAFETY REPORT: description of Identified Uses

Life cycle:

***Formulation or re-packing*:** Formulation & (re)packing of substances and mixtures (GEST2_I)

Uses at industrial sites:[1] Use of substance as intermediate (GEST1B_I), Distribution of substance (GEST1A_I), Use in cleaning agents (GEST4_I), Use as a fuel (GEST12_I), Use as functional fluids

Widespread uses by professional workers: Use as a fuel (GEST12_I)

Consumer uses (G28): Use as a fuel (GEST12_I)

Uses advised against: The Professional and or Consumer Uses of Kerosine substances in coatings, cleaning agents, lubricants, metal working fluids, binders and release agents, agrochemicals, road and construction applications, and explosives are advised against. While these uses have previously been supported, in 2011 ECHA's Committee for Risk Assessment (RAC) issued an Opinion stating that certain petroleum substances in the Naphtha and Kerosine categories presented a hazard of chronic toxicity to the central nervous system. The Opinion proposed more stringent exposure limits which are incompatible with the chemical safety assessments performed for these uses of Kerosine substances. As other Kerosine substances can have composition ranges significantly overlapping those of the substances specified in the Opinion, the advice is applied to all Kerosine substances. Therefore, for reasons of protection of human health, these uses are no longer supported in the registration dossier.

See Annex 1 for a complete list of uses and use descriptors, for which an ES is provided.

1.3 Details of the supplier of the safety data sheet

Company name:	Q8 Quaser s.r.l.
Address:	Via dell'Oceano Indiano, 13
City / Nation:	00144 – Roma (Italia)
Telephone:	+39 06-520881
Competent Technician E-mail:	schede@q8.it

1.4 Emergency telephone number

Italy:	Centro Antiveleni Ospedale Niguarda (Milano), +39 02.66101029
Foreign countries:	Contact the closest Poisons Information Centre

[1] Only for EC 232-366-4 use as functional fluids

SECTION 2: HAZARDS IDENTIFICATION

Physico-chemical hazards: Flammable mixture.

Human health hazard: The mixture causes skin irritation. May cause lung damage if swallowed. Inhalation of vapors may cause drowsiness and dizziness.

Environmental hazard: The mixture has toxic effects to aquatic life with long lasting effects.

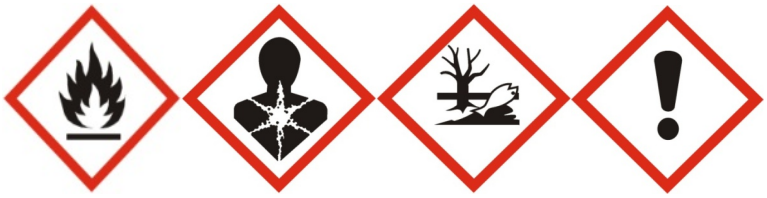
2.1 Classification of the substance or mixture

Flam. Liq. 3:	H226
Skin Irrit. 2:	H315
Asp. Tox. 1:	H304
STOT SE 3:	H336 *(CNS, inhalation)*
Aquatic Chronic 2:	H411

For full text of H-phrases see Section 16.

2.2 Label elements

Hazard pictogram(s):



Signal word: DANGER

Hazard statement(s):
H226 - Flammable liquid and vapour
H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H336 - May cause drowsiness or dizziness
H411 - Toxic to aquatic life with long lasting effects

Precautionary statement(s):
General:
P102 - Keep out of reach of children
Prevention:
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

P273 - Avoid release to the environment

P280 - Wear protective gloves/protective clothing/eye protection/face protection

Response:

P301+310 - IF SWALLOWED: Immediately call a POISON CENTER or a doctor

P331 - Do NOT induce vomiting

Disposal:

P501 - Dispose of contents/container in accordance with local / regional / national / international regulation

2.3 Other hazards

In some circumstances, the product can accumulate static electricity in significant amounts, with the risk of shocks that may cause fire or explosions.

Vapors are heavier than air and may accumulate in confined spaces.

The product does not meet the criteria for classification as PBT or vPvB required by Annex XIII of REACH.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable.

3.2 Mixtures

Component	Identifier	Concentration	Classification accordig to Reg. (CE) 1272/2008
1. **UVCB SUBSTANCE: KEROSINE (PETROLEUM), HYDRODESULFURIZED** *("A complex combination of hydrocarbons obtained from a petroleum stock by treating with hydrogen to convert organic sulfur to hydrogen sulfide which is removed. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C")*	CAS Number: 64742-81-0 EINECS Number: 265-184-9 INDEX Number: 649-423-00-8 Registration Number: 01-2119462828-25-XXXX	0 – 100%	Flam. Liq. 3: H226 Asp. Tox. 1: H304 Skin Irrit. 2: H315 STOT SE 3: H336 *(CNS, inhalation)* Aquatic Chronic 2: H411

2. UVCB SUBSTANCE: KEROSINE (PETROLEUM) *("A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C")*	CAS Number: 8008-20-6 EINECS Number: 232-366-4 INDEX Number: 649-404-00-4 Registration Number: 01-2119485517-27-XXXX	0 – 100%	Flam. Liq. 3: H226 Asp. Tox. 1: H304 Skin Irrit. 2: H315 STOT SE 3: H336 *(CNS, inhalation)* Aquatic Chronic 2: H411

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact: Remove contact lenses, if present and easy to do so. Continue rinsing. If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.

Skin contact: Remove contaminated clothing, contaminated footwear and dispose of safely. Wash affected area with soap and water If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.

For minor thermal burns, cool the burn. Hold the burned area under cold running water for at least five minutes, or until the pain subsides. Body hypothermia must be avoided. When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention. Do not wait for symptoms to develop.

Swallowing /aspiration: Do not induce vomiting as there is high risk of aspiration. Do not give anything by mouth to an unconscious person. in case of ingestion, always assume that aspiration has occurred. The casualty should be sent immediately to hospital. Do not wait for symptoms to develop. If vomiting occurs, the head should be kept low so that the vomit does not enter the lungs (aspiration).

Inhalation: Inhalation is unlikely because of the low vapour pressure of the substance at ambient temperature. If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

If casualty is unconscious and not breathing, ensure that there is no obstruction to breathing and give artificial respiration by trained personnel. If necessary, give external cardiac massage and obtain medical advice.

If the casualty is breathing, place in the recovery position. Administer oxygen if necessary.

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

Contact: reddening, irritation. Slight eye irritation. Inhalation of vapours may cause headache, nausea, vomiting and an altered state of consciousness.

In case of ingestion: few or no symptoms expected. If any, nausea and diarrhea might occur.

4.3 Indication of any immediate medical attention and special treatment needed

In case of inhalation obtain medical attention if casualty has an altered state of consciousness or if symptoms do not resolve.

SECTION 5: FIREFIGHTING MEASURE

5.1 Extinguishing media

Suitable extinguishing media: Small fires: sand or earth, carbon dioxide, foam, dry chemical powder.

Large fires: foam (trained personnel only), water fog (trained personnel only). Other inert gases (subject to regulations).

Unsuitable extinguishing media: do not use direct water jets on the burning product; they could cause splattering and spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2 Special hazards arising from the substance or mixture

Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including CO (carbon monoxide), SOx (sulphur oxides), H_2SO_4 (sulfuric acid) unidentified organic and inorganic compounds.

5.3 Advice for firefighters

In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergemcy personnel:

Stop or contain leak at the source, if safe to do so. Avoid direct contact with released material. Stay upwind. In case of large spillages, alert occupants in downwind areas. Keep non-involved personnel away from the area of spillage. Alert emergency personnel. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency. Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares). If required, notify relevant authorities according to all applicable regulations.

For emergemcy personnel:

Small spillages: normal antistatic working clothes are usually adequate.

Large spillages: full body suit of chemically resistant and antistatic material. Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons. Gloves made of PVA are not water-resistant, and are not suitable for emergency use. Wear work helmet, antistatic non-skid safety

shoes or boots. Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection: a half or full-face respirator with filter(s) for organic vapours or a Self Contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used

6.2 Environmental precautions

Prevent product from entering sewers, rivers or other bodies of water.

6.3 Methods and material for containment and cleaning up

Spillages to the ground: If necessary dike the product with dry earth, sand or similar non-combustible materials. Large spillages may be cautiously covered with foam, if available, to limit fire risk. Do not use direct jets. When inside buildings or confined spaces, ensure adequate ventilation. Absorb spilled product with suitable non-combustible materials. Collect free product with suitable means. Transfer collected product and other contaminated materials to suitable containers for recovery or safe disposal. In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.

Spillages to the water: In case of small spillages in closed waters (i.e. ports) contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents. If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. If this not possible, control the spreading of the spillage, and collect the product by skimming or other suitable mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities. Transfer collected product and other contaminated materials to suitable containers for recovery or safe disposal.

Recommended measures are based on the most likely spillage scenarios for this material. However, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken.

6.4 Reference to other sections

For more information on personal protective equipment, refer to "SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION".

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures

Risk of explosive mixtures of vapour and air. Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products, are followed. Keep away from heat/sparks/open flames/hot surfaces. Do not smoke.

Use and store only outdoors or in a well-ventilated area. Use adequate personal protective equipment as needed. Do not use compressed air for filling, discharging, or handling operations. The vapour is heavier than air: beware of accumulation in pits and confined spaces. Avoid contact with skin and eyes. Do not ingest. Do not breathe vapours.

For more information regarding protective equipment and operational conditions see Exposure scenarios. Prevent the risk of slipping. Avoid release to the environment.

7.1.2 Advice on general occupational hygiene

Ensure that proper housekeeping measures are in place. Contaminated materials should not be allowed to accumulate in the workplaces and should never be kept inside the pockets. Keep away from food and beverages. Do not eat, drink or smoke when using this product. Wash the hands thoroughly after handling. Do not reuse contaminated clothing.

7.2 Conditions for safe storage, including any incompatibilities

Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills. Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content and flammability.

Store separately from oxidising agents.

Recommended materials for containers, or container linings use mild steel, stainless steel. Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

If the product is supplied in containers. Keep only in the original container or in a suitable container for this kind of product.

Keep containers tightly closed and properly labelled.

Empty containers may contain combustible product residues, these can cause flammability / explosion hazards. Open slowly in order to control possible pressure release. Keep only in the original container or in a suitable container for this kind of product. Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.

7.3 Specific end use(s)

See attached Exposure Scenarios

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limit values:

Component	Occupational exposure limit values	Reference

KEROSINE	TLV®-TWA:	200 mg/m^3	ACGIH 2019

Occupational exposure limit values: No data available

Monitoring procedures: refer to relevant legislation and in any case to the good industrial heath practices in the work place.

DNEL (Derived No Effect Level) / DMEL (Derived Minimum Effect Level):

	DNEL Workers				DNEL General Population			
Exposure Route	Long-term, local effects	Long-term, systemic effects	Acute, local effects	Acute, systemic effects	Long-term, local effects	Long-term, systemic effects	Acute, local effects	Acute, systemic effects
oral	n.a.	n.a.	n.a.	n.a.	n.a.	19 mg/kg/24h	n.a.	n.a.
dermal	Note (b)	Note (a)	Note (b)	Note (a)	Note (b)	Note (a)	Note (b)	Note (a)
inhalation	Note (a)	Note (a)	Note (a)	Note (a)	Note (a)	Note (a)	Note (a)	Note (a)

Note a: No hazard identified for this route (data available)

Note b: The data do not allow setting a DNEL.

PNEC(S) (Predicted No Effect Concentration):

PNEC(S) Water, Sediment and Soil: Substance is a hydrocarbon UVCB: The hydrocarbon block method is used for environmental risk assessment (see REACH guidance, R7, app.13-1). A PNEC cannot be derived for UVCBs, therefore, the risk assessment on the library of representative constituents uses HC5 from the Target Lipid Model (TLM). Following Final Decisions issued by ECHA, a review of the TLM has been conducted that led to a revised TLM-model and the new results are used in this dossier. For full details refer to the following Appendixes attached in IUCLID Section 13: PETRORISK – ProductLibrary 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 and flammability.

8.2.2 Individual protection measures

Eye/face protection: In the absence of containment system, if splashing is likely, full head and face protection (protective shield and/or safety goggles (EN 166)) should be used.

Skin protection: **i) Hand protection:** In the absence of containment systems and in case of possible contact with the skin, use gloves with hydrocarbon-resistant high cuffs, felt-lined, and insulated if necessary. Supposedly adequate materials: nitrile, PVC or PVA (polyvinyl alcohol) with an index of protection against chemical agents at least equal to 5 (breakthrough time> 240 minutes). Neoprene or natural rubber (latex) do not have adequate characteristics of strength. Use gloves in accordance with the conditions and limits set by the manufacturer. In the case, refer to UNI EN 374. Gloves must be periodically inspected and changed in case of wear, perforations or contaminations.

ii) Other: In the case of product handling, use Long Sleeves Working Clothes. Refer to regulations UNI EN 465-466-467. Wash contaminated clothing before wearing it again.

Respiratory protection: In ventilated areas or outdoors: None.

If exposure levels cannot be determined or estimated with adequate confidence, or an oxygen deficiency is possible, only SCBA's should be used

Thermal hazards: See previous *Skin protection*.

8.2.3 Controlli dell'esposizione ambientale

Avoid release to the environment. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

Prevent discharge of undissolved substance to or recover from onsite wastewater.

Do not apply industrial sludge to natural soils.

Sludge should be incinerated, contained or reclaimed.

8.3 Other information

For more information on personal protective equipment and operating conditions, refer to attached Exposure Scenarios.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) *Appearance*	Clear liquid
b) *Odour*	Petroleum odour
c) *Odour threshold*	Not available

d) *pH*	Not applicable
e) *Melting point/freezing point*	< -20°C
f) *Initial boiling point and boiling range*	90 - 300°C (range)
g) *Flash point*	> 23°C
h) *Evaporation rate*	Not applicable
i) *Flammability (solid, gas)*	Not applicable
j) *Upper/lower flammability or explosive limits*	LEL 1.16%, UEL 6.0%
k) *Vapour pressure*	1 – 21 kPa @ 37,8 °C
l) *Vapour density*	Not applicable
m) *Density*	0,75 – 0,86 kg/dm^3 @ 15°C
n) *Solubility(ies)*	Not applicable: substance is a hydrocarbon UVCB.
o) *Partition coefficient: n-octanol/water*	Not applicable: substance is a hydrocarbon UVCB.
p) *Auto-ignition temperature*	> 220°C
q) *Decomposition temperature*	Not applicable
r) *Viscosity*	1 – 2,5 cSt @ 40°C and 2,9 - 12 cSt @ -20°C
s) *Explosive properties*	Non explosive, there are no chemical groups associated with explosive properties in the molecules (Ref. Column 2 of REACH Annex VII)
t) *Oxidising properties*	Non oxidising, on the basis of its chemical structure, the substance is incapable of reacting exothermically with combustible materials (Ref. Column 2 of REACH Annex VII)

9.2 Other information

The methods of analysis for the characteristics, which correspond to those recognized nationally and internationally, are set mostly in the technical specifications of the product.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

The mixture does not present additional dangers of reactivity than those reported in the next subtitle.

10.2 Chemical stability

This substance is stable in relation to its intrinsic properties.

10.3 Possibility of hazardous reactions

Contact with strong oxidizers (peroxides, chromates, etc.) may cause a fire hazard. A mixture with nitrates or other strong oxidisers (e.g. chlorates, perchlorates, liquid oxygen) may create an explosive mass. Sensitivity to heat, friction or shock cannot be assessed in advance.

10.4 Conditions to avoid

Store separately from oxidising agents.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

Avoid Static Electricity.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

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

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicokinetics, metabolism and distribution

The studies of the pharmacokinetics of kerosine are scarce. Some toxicokinetic behaviour of components of the category has been studied and reported.
Dermal application of kerosine shows that the aromatic and aliphatic constituents are well absorbed into the skin, and that the aromatics penetrate the skin at a higher rate than the alkanes. After absorption, the kerosine constituents are distributed via the blood circulation to the fat tissue and various organs.

The inhalation studies demonstrate that the volatile kerosine constituents are well absorbed (31 – 54%) and are distributed mainly in the fat tissue. Aromatics were metabolised at a higher rate than naphthenes, n-alkanes, isoalkanes and 1-alkenes.
Studies with oral exposure to kerosine indicate that gastrointestinal absorption of kerosine is slow and incomplete, resulting in low bioavailability.

11.1 Information on toxicological effects

a) Acute toxicity

Kerosine has low acute toxicity, with an oral LD50 greater than 5000 mg/kg (rat), a dermal LD50 greater than 2000 mg/kg (rabbit), and an inhalation LC50 greater than 5.28 mg/L (rat). The most important effects in animals, following very high oral dosages, were slight irritation of the stomach and the gastrointestinal tract. The only adverse effects observed in acute inhalation studies were decreased activity and breathing frequency at very high doses. Dermal application of kerosine did not lead to acute toxic systemic effects. Clinical effects observed were related to dermal irritation rather than to systemic toxicity.

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
Oral			
RAT oral: gavage EPA OTS 798.1175 OECD Guideline 420	LD50 > 5000 mg/kg (M/F) lack of mortality and systemic effects	Key Study CAS 68333-23-3 Reliable without restriction	ARCO (Atlantic Richfield Company) 1992a

Inhalation			
RAT inhalation: vapour OECD Guideline 403 (Acute Inhalation Toxicity)	LC50 4h > 5,28 mg/l (M/F) lack of mortality and systemic effects	Key Study CAS 8008-20-6 Reliable without restriction	Studio di American Petroleum Institute (API) 1987a
Dermal			
RABBIT Coverage: occlusive EPA OTS 798.1100 OECD Guideline 402	LD50 > 2000 mg/kg (M/F) lack of mortality and systemic effects	Key Study CAS 68333-23-3 Reliable without restriction	ARCO (Atlantic Richfield Company) 1992g

(b) Skin corrosion/irritation

Animal studies (rabbits) demonstrate that kerosine may act as a skin irritant. Most of the studies and the overall weight of evidence indicates that kerosines are irritating to skin. These findings support classification of Kerosines as Skin Irrit. 2, H315 (Causes skin irritation).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RABBIT Coverage: semiocclusive (shaved) OECD Guideline 404	not irritating Mean erythema score: 0.17 of max. 4 (mean) (fully reversible within: 48 hours) Mean edema score: 0 of max. 4	Key Study Kerosine Reliable without restriction	Shell (1991a)
RABBIT Coverage: occlusive (intact skin) EPA Guidelines in FR Vol. 44, No. 145, pgs. 44054-44093	Irritating Mean erythema score: 3.46 of max. 4 (not fully reversible within: 10 days) Mean edema score: 2.33 of max. 4 (not fully reversible within: 10 days)	Key Study Kerosine Reliable with restriction	ARCO (Atlantic Richfield Company) 1986 d

(c) Serious eye damage/irritation

A number of well-controlled animal experiments performed on a variety of kerosines indicate that none of the kerosines and jet fuels tested were more than slightly irritating to the eyes.
None of the hazard assessments of kerosine and jet fuel constituents have resulted in classification for eye irritation.
Based on available data, the classification criteria are not met.

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RABBIT EPA OTS 798.4500 (Acute Eye Irritation)	not irritating Mean Cornea score: 0 of max 80 Mean Iris score: 0 of max 10	Key Study CAS 68333-23-3 Reliable without restriction	ARCO (Atlantic Richfield Company) 1992n

	Mean Conjunctivae score: 0 of max. 20		

(d) Respiratory or skin sensitization

Respiratory system:

This endpoint is not a REACH requirement. Furthermore no data were available for this endpoint. Products in the category of kerosine does not cause respiratory sensitization, thus it is not necessary any product classification.

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

Skin sensitisation:

There are several studies to test the sensitization potential of products in the category of kerosine.
Based on test data, there was no evidence of skin sensitization.

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
GUINEA PIG EPA OTS 798.4100 (Skin Sensitisation) OECD Guideline 406	not sensitising	Key Study CAS 68333-23-3 Reliable without restriction	ARCO (Atlantic Richfield Company) 1992q

(e) Germ cell mutagenicity

The weight of evidence from several *in vitro* and *in vivo* mutagenic studies indicates that kerosine and jet fuels are likely not mutagens.

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

The following is a summary of the more representative study of the registration dossier.

In vitro studies:

Method	Results	Remarks	Reference
Modified Ames assay S. typhimurium TA98 Doses: 50 µl/mL Modified Ames test (ASTM E1687)	Negative	Key Study CAS 64742-81-0 Reliable without restriction	Mobil (1991)
Modified Ames assay S. typhimurium TA98 Doses: 50 µl/mL Modified Ames test (ASTM E1687)	Negative	Key Study CAS 8008-20-6 Reliable without restriction	Mobil (1991)
sister chromatid exchange assay in mammalian cells Chinese hamster Ovary (CHO) Doses: Without metabolic	Negative	Key Study CAS 64742-81-0 Reliable without restriction	American Petroleum Institute (API) 1988a

activation: 0.007, 0.013, 0.025, and 0.05 µl/ml With metabolic activation: 0.05, 0.1, 0.2, and 0.4 µl/ml OECD Guideline 479			

In vivo studies:

Method	Results	Remarks	Reference
chromosome aberration assay RAT (M/F) Intraperitoneal 0, 0.3, 1.0 & 3.0 g/kg (analytical conc.) OECD Guideline 475	Negative	Key Study CAS 8008-20-6 Reliable without restriction	American Petroleum Institute (API) 1985c
chromosome aberration assay RAT (M/F) Intraperitoneal 0.3, 1.0 & 3.0 g/kg OECD Guideline 475	Negative	Key Study CAS 64742-81-0 Reliable without restriction	American Petroleum Institute (API) 1984b

(f) Carcinogenicity

Kerosine is not carcinogenic when animals are exposed via the oral or inhalation route. However, chronic skin contact with kerosines and jet fuel may lead to tumour formation as a consequence of repeated cycles of irritation, skin damage and repair.

Jet fuels and kerosines were not found to be mutagenic or genotoxic, and the observations from animal studies confirm the non-genotoxic nature of the skin tumour formation. Although dermal irritation alone seems not sufficient to cause dermal tumourigenicity, studies clearly show that dermal irritation and inflammation are prerequisites for dermal carcinogenicity.

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
mouse (C3H/HeNCrlBR) male 37.5 µl (Amount applied) Exposure: 2 years (twice each week) OECD Guideline 451	Neoplastic effects: yes	Key Study JET fuel A Reliable without restriction	Freeman J.J., Federici T.M., McKee R.H. (1993)
mouse (C3H/HeJ) male/female 50 µl (applied dose) Exposure: lifetime (twice per	dose level: 50 µL Neoplastic effects: yes	Key Study CAS 64742-81-0 Reliable with restriction	American Petroleum Institute (API) 1989b

week) OECD Guideline 451			

(g) Reproductive toxicity

Effects on fertility:

Most studies have not shown consistent evidence of toxicity to fertility.

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RAT male/female fertility oral: gavage Males: 750, 1500, or 3000 mg/kg/day (actual ingested) Females: 325, 750, or 1500 mg/kg/day (actual ingested) Exposure: Males were treated for 70 to 90 days. Females were treated for 21 weeks. (Daily)	NOAEL (P): 750 mg/kg bw/day (female) based on: test mat. (body weight) NOAEL (reproduction) (P): >= 3000 mg/kg bw/day (male) based on: test mat. (duration of pregnancy; pregnancy rate; sperm characterization) NOAEL (reproduction) (P): >= 1500 mg/kg bw/day (female) based on: test mat. (duration of pregnancy; live birth index; pregnancy rate; litter size; litter weight) NOAEL (F1): 750 mg/kg bw/day (male/female) based on: test mat. (pup weight)	Key Study JP-8 jet fuel Reliable without restriction	Mattie, D.R., Marit, G.B., Cooper, J.R., Sterner, T.R., Flemming, C.D. (2000)

Effects on Developmental toxicity:

Most studies have not shown consistent evidence of developmental toxicity / teratogenicity major components of the product

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RAT oral: gavage 500, 1000, 1500, or 2000 mg/kg/day (actual ingested) Exposure: 10 days (daily) OECD Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEL (embryotoxicity): 1000 mg/kg bw/day (foetal weights) LOAEL (embryotoxicity): 1500 mg/kg bw/day (foetal weights) NOAEL (maternal toxicity): 500 mg/kg bw/day (body weight) LOAEL (maternal toxicity): 1000 mg/kg bw/day (body weights)	Key Study JP-8 jet fuel Reliable without restriction	Cooper, J.R., Mattie, D.R. (1996)
RAT inhalation (whole body)	NOAEC (maternal toxicity): >= 364 ppm	Key Study CAS 8008-20-6	American Petroleum Institute (API) 1979b

106 or 364 ppm (analytical conc.) Exposure: Six hours each day (Daily) OECD Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEC (teratogenicity): >= 364 ppm	Reliable without restriction	

(h) STOT-single exposure

Kerosines are classified as STOT SE3 3, H336 (May cause drowsiness or dizziness)

(i) STOT-repeated exposure

A number of subacute and subchronic studies with kerosines and jet fuels are available. The repeated inhalation and oral studies of kerosine in rats produced no consistent toxicological effects. Based on the lack of adverse systemic effects even with the highest doses administered, kerosines are not classified.

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

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
Oral			
RAT male/female subchronic (oral: gavage) Males: 750, 1500, or 3000 mg/kg/day (actual ingested) Females: 325, 750, or 1500 mg/kg/day (actual ingested) Exposure: Males were treated for 70 to 90 days. Females were treated for 21 weeks. (Daily)	NOAEL: 750 mg/kg bw/day (female) (body weight)	Key Study JP-8 jet fuel Reliable without restriction	Mattie, D.R., Marit, G.B., Cooper, J.R., Sterner, T.R., Flemming, C.D. (2000)
Inhalation			
RAT male/female subacute (inhalation: vapour) (whole body) 24 mg/m³ (vapour) Exposure: Four weeks (6 hours/day, 5 days/week for four consecutive weeks) OECD Guideline 412	NOAEC: >= 24 mg/m³ air (male/female) (No treatment-related effects observed.)	Key Study CAS 64742-81-0 Reliable without restriction	American Petroleum Institute (API) 1986
RAT male/female	NOAEL: >= 1000 mg/m³ air (female) (overall effects)	Key Study JP-8 jet fuel	Mattie, D.R., Alden, C.L., Newell, T.K., Gaworski, C.L.,

subchronic (inhalation: vapour) (whole body) 0, 500, or 1000 mg/m3 Exposure: 90 days (Constant (24 hours a day) for the 90 days) OECD Guideline 413	LOAEL: 500 mg/m³ air (male) (Body weight; organ weights; and histopathology. These effects were due to alpha-2u globulin-mediated nephropathy.)	Reliable without restriction	Flemming, C.D. (1991)
Dermal			
RAT male/female subacute 0.01, 0.05, or 0.50 mL/kg/day Exposure: 4 weeks (6 hours a day, 5 days a week) OECD Guideline 410	NOAEL: >= 0.5 mL/kg bw (male/female) Skin LOAEL: 0.01 mL/kg bw (male/female)	Key Study CAS 68333-23-3 Reliable without restriction	ARCO (Atlantic Richfield Company) 1992v

(j) Aspiration hazard

The low viscosity of kerosines (<20.5 mm2/s @ 40 °C) may cause risk of aspiration into the lungs during swallowing or subsequent vomiting with lung inflammation (chemical pneumonitis). Kerosines are classified Asp. Tox. 1, H304 (May be fatal if swallowed and enters airways).

Other information

There are no further information.

SECTION 12: ECOLOGICAL INFORMATION

According to the information below reported Kerosines are classified as Aquatic Chronic 2, H411 (Toxic to aquatic life with long lasting effects).

12.1 Toxicity

The following is a summary of the more representative study of the registration dossier.

Endpoint	Results	Remarks	Reference
Aquatic Toxicity			
Invertebrates Daphnia magna Short-term OECD Guideline 202	EL50 (48 h): 1,4 mg/L (mobility) EL50 (24 h): 4,6 mg/L (mobility) NOEL (48 h): 0,3 mg/L (mobility)	Key Study CAS 64742-81-0 Reliable without restriction	Exxon (1995d)
Invertebrates	EL50 (21 d): 0,89 mg/L (reproduction)	Key Study	

Daphnia magna Long-term OECD Guideline 211	EL50 (21 d): 0,81 mg/L (immobilisation) NOEL (21 d): 0,48 mg/L (reproduction) LOEL (21 d): 1,2 mg/L (reproduction) NOEL (21 d): 1,2 mg/L (adult length) LOEL (21 d): 0,48 mg/L (adult length)	CAS 64742-81-0 Reliable without restriction	
Alghe Pseudokirchnerella subcapitata Growth Inhibition Test OECD Guideline 201	EL50 (24 h): 1 — 3 mg/L (cell number) EL50 (48 h): 1 — 3 mg/L (cell number) EL50 (72 h): 1 — 3 mg/L (cell number) NOEL (24 h): 1 mg/L (cell number) NOEL (48 h): 1 mg/L (cell number) LOEL (72 h): 1 mg/L (cell number)	Key Study CAS 64742-94-5 Reliable without restriction	Shell (1994)
Alghe Pseudokirchnerella subcapitata Growth Inhibition Test OECD Guideline 201	EL50 (72 h): 10 — 30 mg/L (growth rate) EL50 (48 h): > 30 mg/L (growth rate) EL50 (24 h): > 30 mg/L (growth rate) NOEL (72 h): 10 mg/L (growth rate) NOEL (48 h): 10 mg/L (growth rate) NOEL (24 h): 10 mg/L (growth rate)	Supporting Study CAS 64742-81-0 Reliable without restriction	Shell (1995)
Fish Oncorhynchus mykiss Short-term OECD Guideline 203	LL50 (96 h): 2 — 5 mg/L LL50 (72 h): 2 — 5 mg/L LL50 (48 h): 2 — 5 mg/L LL50 (24 h): 5 — 17 mg/L NOEL (96 h): 2 mg/L	Key Study CAS 64742-94-5 Reliable without restriction	Shell (1994)

12.2 Persistence and degradability

Abiotic degradation:

Hydrolisis: kerosines are resistant to hydrolysis because they lack a functional group that is hydrolytically reactive. Therefore, this fate process will not contribute to a measurable degradative loss of these substances from the environment.

Biotic degradation:

On the basis of the available studies and properties of hydrocarbons C9-C16, kerosines are readily to inherently biodegradable.

12.3 Bioaccumulative potential

Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

12.4 Mobility in soil

Partition coefficient Koc: Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

12.5 Results of PBT and vPvB assessment

Comparison with the criteria in Annex XIII of REACH

Persistence Assessment: An evaluation of representative hydrocarbon structures indicate some structures meet the Persistent (P) or very Persistent (vP) criteria.

Bioaccumulation Assessment: An evaluation of representative hydrocarbon structures indicate NO structures meet the very Bioaccumulative (vB) criterion but some structures meet the Bioaccumulative (B) criterion.

Toxicity Assessment: For representative hydrocarbons structures that were found to meet the P and B criteria, a toxicity evaluation was performed. No structures relevant to petroleum substances were found to meet the toxicity criterion except anthracene which has been confirmed as a PBT substance. Anthracene is not present in this substance at greater than 0.1%, therefore, this substance is not considered a PBT/vPvB.

12.6 Other adverse effects

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not dispose the product, either new or used, by discharging into sewers, tunnels, lakes or water courses.

Dispose wastes and contaminated packaging according to local regulations.

European Waste Catalogue code(s) (Decision 2001/118/CE): 13 07 03*. These codes can be given only as a suggestion, according to the original composition of the product, and its intended (foreseeable) use(s).

The final user (producer of the waste) has the responsibility for the attribution of the most suitable code, according to the actual use(s) of the material, contaminations or alterations. The product does not contain halogenated compounds.

Disposal of emptied containers: do not dispose the containers in the environment. Dispose in accordance with local regulations.

Do not cut, weld, bore, burn or incinerate emptied containers, unless they have been cleaned and declared safe.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number

UN 1223

14.2 UN proper shipping name

Italian: CHEROSENE
English: KEROSINE

14.3 Transport hazard class(es)

Road transport (ADR):	Class: 3 Subsidiary risks: -
Railway transport (RID):	Class: 3 Subsidiary risks: -
Inland waterways transport (ADN):	Class: 3 Subsidiary risks: N2, F
Sea transport (IMDG):	Class: 3 Subsidiary risks: -
Air transport (IATA):	Class: 3 Subsidiary risks: -

14.4 Packing group

PG: III

14.5 Environmental hazards

Road transport (ADR):	Dangerous for the environment
Railway transport (RID):	Dangerous for the environment
Inland waterways transport (ADN):	Dangerous for the environment
Sea transport (IMDG):	Marine Pollutant
Air transport (IATA):	Dangerous for the environment

14.6 Special precautions for user

Transportation, including loading and unloading, must be performed by personnel who have received the necessary training required by the relevant modal regulations concerning the transport of dangerous goods.
During loading and unloading apply safety measures required by section 7.1 and individual protection measures required by section 8.2.2 of this SDS.

General additional information

Mark and labeling:	WARNING LABEL N. 3 + MARK OF
(except packaging exemption)	ENVIRONMENTAL HAZARD

Additional information on raod transport (ADR)

Tunnel restriction code:	(D/E)
Hazard Identification Number (tank):	30
High Consequence Dangerous Goods (HCDG):	NO

Additional information on railway transport (RID)

Hazard Identification Number (tank):	30
High Consequence Dangerous Goods (HCDG):	NO

Additional information on internal waterways transport (ADN)

Hazard Identification Number (tank):	30
High Consequence Dangerous Goods (HCDG):	NO

Additional information on sea transport (IMDG)

Emergency measures on board: EmS F-E, S-E

Additional information on air transport (IATA)

Emergency measures in case of aircraft accidents: ERG Code 3L

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

Not applicable (refer to Annex I of MARPOL Convention).

SECTION 15: REGULATORY INFORMATION

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

Authorisations according to REACH Regulation (Title VII):

Product not subject to authorisation.

Restrictions according to REACH Regulation (Title VIII):

Product subject to restrictions: entry 3 (dangerous liquid substances/mixtures), entry 40 (flammable substances)

Other European Regulation and National Legislation

- Directive 2012/18/UE and italian D. Lgs. 105/2015, on the control of major-accident hazards involving dangerous substances.

  Seveso category:

  Annex 1, part 1: category P5a- flammable liquids

  category E2- Hazardous to the Aquatic Environment in Category Chronic 2

  Annex 1 part 2: category 34- Petroleum products and alternative fuels

- Directive 98/24/EC and Italian D. Lgs. 81/2008 e s.m.i., on the protection of the health and safety of workers from the risks related to chemical agents at work

- Italian D. Lgs. 152/2006 e s.m.i., on waste disposal

15.2 Chemical safety assessment

Chemical safety assessment has been carried out for components of the mixture.

SECTION 16: OTHER INFORMATION

Revision Index:

First issue date:	01/12/2010
Revision Number:	01
Revision Date:	20/05/2016
Grounds for review:	Deletion of classification according to Directive 67/548/CEE and related references Precautionary statement P210 modified; addition of new precautionary statement P273 Deletion of Note H Section 8 updated Section 14 updated Section 15, subsection 15.1 updated
Revision Number:	02
Revision Date:	27/10/2017
Grounds for review:	Section 1.2 updated
Revision Number:	03
Revision Date:	15/02/2018
Grounds for review:	Section 14 updated
Revision Number:	*04*
Revision Date:	*29/07/2019*
Grounds for review:	Section 1 updated Section 3 updated Section 8 updated Scenarios exposure updated

Legend to abbreviations and acronyms

ACGIH	=	American Conference of Governmental Industrial Hygienists
API	=	American Petroleum Institute
CSR	=	Chemical Safety Report
DNEL	=	Derived No Effect Level
DMEL	=	Derived Minimum Effect Level
EC50	=	Effective Concentration, 50%

EL50	=	Effective Load, 50%
Klimisch	=	Criterion for the evaluation of the method reliability
LC50	=	Lethal Concentration, 50%
LD50	=	Lethal Dose, 50%
LL50	=	Lethal Load, 50%
NOAEC	=	No Observed Adverse Effect Concentration
NOAEL	=	No Observed Adverse Effect Level
NOEL	=	No Observed Effect Level
OECD	=	Organisation for Economic Co-operation and Development
PNEC	=	Predicted No Effect Concentration
PBT	=	Persistent, Bioaccumulative and Toxic
STOT	=	Tossicità specifica per organi bersaglio
(STOT) RE	=	Specific target organ toxicity — repeated exposure
(STOT) SE	=	Specific target organ toxicity — single exposure
TLV®TWA	=	Threshold Limit Value – time-weighted average
TLV®STEL	=	Threshold Limit Value – short-term exposure limit
UVCB	=	Unknown or Variable composition, Complex reaction products or Biological materials
vPvB	=	very Persistent and very Bioaccumulative
P	=	Persistent
vP	=	very Persistent
B	=	Bioaccumulative
vB	=	very Bioaccumulative

Key literature references and sources for data

Registration Dossier.

CRS 2016, CRS 2017, CRS 2018

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008

Expert judgment and/or Calculation method.

Full text of appropriate statements

Hazard Statements

H226:	Flammable liquid and vapour
H304:	May be fatal if swallowed and enters airways
H315:	Causes skin irritation
H336:	May cause drowsiness or dizziness
H411:	Toxic to aquatic life with long lasting effects

Hazard classes

Flam. Liq. 3:	Flammable Liquid, Category 3
Skin Irrit. 2:	Skin irritation, Category 2
Asp. Tox. 1:	Aspiration hazard, Category 1

STOT SE 3: Specific target organ toxicity — single exposure, Category 3
Aquatic Chronic 2: Hazardous to the aquatic environment, Category 2

Advice on workers training

Properly traine workers potentially exposed to this substance on the basis of the contents of this safety data sheet

To the best of our knowledge, the information contained herein is accurate. This information is intended to describe the product for the purposes of health, safety and environmental requirements only and it should not therefore be construed as guaranteeing any specific property of the product. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. Uses not listed in this document are not recommended unless an assessment is completed.

ANNEX 1

EXPOSURE SCENARIOS

INDEX

- **Kerosine**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Distribution of substance EC 265-184-9	Industrial	n.a.	n. a.	1, 2, 3, 4, 8a, 8b, 9, 15	4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
2. Formulation & (re)packing of substances and mixtures EC 265-184-9	Formulation	n.a.	n. a.	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	ESVOC SpERC 2.2.v1
3. Use in Cleaning Agents EC 265-184-9	Industrial	n.a.	n. a.	1, 2, 3, 4, 7, 8a, 8b, 10, 13	4	ESVOC SpERC 4.4a.v1
4. Use as a fuel EC 265-184-9	Industrial	n.a.	n. a.	1, 2, 3, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
5. Use as a fuel EC 265-184-9	Professional	n.a.	n. a.	1, 2, 3, 8a, 8b, 16	9a, 9b	ESVOC SpERC 9.12b.v1
6 Use as a fuel EC 265-184-9	Consumer	n.a.	13	n.a.	9a, 9b	ESVOC SpERC 9.12.c.v1
1. Distribution of substance EC 232-366-4	Industrial	n.a.	n. a.	1, 2, 3, 4, 8a, 8b, 9, 15	4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
2. Formulation & (re)packing of substances and mixtures EC 232-366-4	Formulation	n.a.	n. a.	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	ESVOC SpERC 2.2.v1
3. Use in Cleaning Agents EC 232-366-4	Industrial	n.a.	n. a.	1, 2, 3, 4, 7, 8a, 8b, 10, 13	4	ESVOC SpERC 4.4a.v1
4. Use as a fuel EC 232-366-4	Industrial	n.a.	n. a.	1, 2, 3, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
5. Use as a fuel EC 232-366-4	Professional	n.a.	n. a.	1, 2, 3, 8a, 8b, 16	9a, 9b	ESVOC SpERC 9.12b.v1
6. Use as a fuel EC 232-366-4	Consumer	n.a.	13	n.a.	9a, 9b	ESVOC SpERC 9.12.c.v1
7. Use as Functional Fluids EC 232-366-4	Industrial	n.a	n.a.	1, 2, 3, 4, 8a, 8b, 9	7	ESVOC SpERC 7.13a.v1

1. Distribution of substance EC 265-184-9 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories	4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, and associated laboratory activities. Excludes emissions during transport.	
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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.4e6
Fraction of Regional tonnage used locally	2e-3
Annual site tonnage (tonnes/year)	4.8e3
Maximum daily site tonnage (kg/day)	4.8e-4
Frequency and duration of use	

Continuous release [FD2].	
Emission days (days/year)	100
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-3
Release fraction to wastewater from process (initial release prior to RMM)	1.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
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 [TCR10].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.4e6
Assumed domestic sewage treatment plant flow (m3/d)	2000
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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	3.2E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2.0E-02

2. Formulation & (re)packing of substances and mixtures EC 265-184-9 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15
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, maintenance, 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS30 mixing operations (open systems)	No other specific measures identified. EI20
CS34 Manual / CS22 Transfer from/pouring from containers.	No other specific measures identified. EI20
CS8 Drum/batch transfers	No other specific measures identified. EI20
CS100 Tabletting, compression, extrusion or pelletisation	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	

Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.1e6
Fraction of Regional tonnage used locally	1.4e-2
Annual site tonnage (tonnes/year)	3.0e-4
Maximum daily site tonnage (kg/day)	1.0e5
Frequency and duration of use	
Continuous release [FD2].	
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) (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	2.5e-2
Release fraction to wastewater from process (initial release prior to RMM)	2.0e-4
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 [TCS1].	
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 [TCR14]. If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	94.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.2e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed	

to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.3E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	8.4E-01

3. Use in Cleaning Agents EC 265-184-9 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Use in Cleaning Agents	
Use Descriptor	
Sector(s) of Use	n.a.
Process Categories	1, 2, 3, 4, 7, 8a, 8b, 10, 13
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC SpERC 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release e.g. spraying. E4.
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS93 Automated process with (semi) closed system, CS38 Use in contained systems	No other specific measures identified. EI20
CS93 Automated process with (semi) closed system, CS38 Use in contained systems. CS8 Drum / batch transfers.	No other specific measures identified. EI20
CS101 Application of cleaning products in closed systems.	No other specific measures identified. EI20
CS45 Filling / preparation of equipment (from drums or containers), CS81 Dedicated facilities.	No other specific measures identified. EI20
CS37 Use in contained batch processes / CS76 Semi Automated process. (e.g.: Semi automatic	No other specific measures identified. EI20

application of floor care and maintenance products)	
CS4 Dipping, immersion and pouring	No other specific measures identified. EI20
CS42 Cleaning with low-pressure washers	No other specific measures identified. EI20
CS44 Cleaning with high pressure washers	No other specific measures identified. EI20
CS34 Manual / CS47 Cleaning / CS48 Surfaces / CS60 No spraying	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS67 Storage, CS137 Product sampling	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.8
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	3.8
Maximum daily site tonnage (kg/day)	1.9
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
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 [TCS1].	
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] Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR10].	
Treat air emission to provide a typical removal efficiency of (%)	70
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.3e4
Assumed domestic sewage treatment plant flow (m3/d)	2000

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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	3.3E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	5.6E-03

4. Use as a fuel EC 265-184-9-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Use as a fuel	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 8a, 8b, 16
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 additives and additive components) 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
GEST_12I Use as a fuel, CS107 (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS8 Drum/Batch transfers	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.7e5
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	3.7e5
Maximum daily site tonnage (kg/day)	1.2e6
Frequency and duration of use	
Continuous release [FD2].	
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-3
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
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 [TCS1].	
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, additional onsite wastewater treatment required [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	90.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	00
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.4e6
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.7E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	5.2E-01

5. Use as a fuel EC 265-184-9-4 – Professional Sector

Section 1 Exposure Scenario	
Title	
Use as a fuel	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 8a, 8b, 16
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 additives and additive components) 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
GEST_12I Use as a fuel, CS107 (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS22 Transfer from/pouring from containers	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.7e6
Fraction of Regional tonnage used locally	5.0e-4
Annual site tonnage (tonnes/year)	8.4e2
Maximum daily site tonnage (kg/day)	2.3e3
Frequency and duration of use	
Continuous release [FD2].	
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) [OOC7]	1.0E-3
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
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 [TCR10].	
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
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.5e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	9.2E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	6.4E-03

6 . Use as a fuel EC 265-184-9-4 – Consumer

Section 1 Exposure Scenario		
Title		
Use as a fuel		
Use Descriptor		
Sector(s) of Use	NA	
Process 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 worker exposure		
Product characteristics		
Physical form of product	Liquid	
Vapour Pressure (kPa)	Liquid, vapour pressure > 10Pa (STP) [OC15]	
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13	
Amounts used	Unless otherwise stated, covers use amounts up to 50000g [ConsOC2]; covers skin contact area up to 420cm2 [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]	
Other Operational Conditions Affecting Exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**	
PC13:Fuels--Liquid -: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 50000g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - home heating fuel	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 1500g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 1000g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid : Garden Equipment - Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 420.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 1000g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	7.6e4
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	3.8e1
Maximum daily site tonnage (kg/day)	1.0e2
Frequency and duration of use	
Continuous release [FD2].	
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) [OOC7]	1.0e-3
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.0
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.8e4
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	6.1E-05
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	5.6E-03

1. Distribution of substance EC 232-366-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories	4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, and associated laboratory activities. Excludes emissions during transport.	
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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5e6
Fraction of Regional tonnage used locally	2e-3
Annual site tonnage (tonnes/year)	1e4
Maximum daily site tonnage (kg/day)	3.3e4
Frequency and duration of use	
Continuous release [FD2].	

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-3
Release fraction to wastewater from process (initial release prior to RMM)	1.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
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 [TCR10].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	40.3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	4.1e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.8E-02

2. Formulation & (re)packing of substances and mixtures EC 232-366-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15
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, maintenance, 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS30 mixing operations (open systems)	No other specific measures identified. EI20
CS34 Manual / CS22 Transfer from/pouring from containers.	No other specific measures identified. EI20
CS8 Drum/batch transfers	No other specific measures identified. EI20
CS100 Tabletting, compression, extrusion or pelletisation	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	

Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.4e6
Fraction of Regional tonnage used locally	8.9e-3
Annual site tonnage (tonnes/year)	3.0e4
Maximum daily site tonnage (kg/day)	1.0e5
Frequency and duration of use	
Continuous release [FD2].	
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) (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	2.5e-2
Release fraction to wastewater from process (initial release prior to RMM)	2.0e-4
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 [TCS1].	
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 [TCR14]. If discharging to domestic sewage treatment plant, additional onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	93.3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	00
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.4e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed	

to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	7.3E-01

3. Use in Cleaning Agents EC 232-366-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Use in Cleaning Agents	
Use Descriptor	
Sector(s) of Use	n.a.
Process Categories	1, 2, 3, 4, 7, 8a, 8b, 10, 13
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC SpERC 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release e.g. spraying. E4.
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS93 Automated process with (semi) closed system, CS38 Use in contained systems	No other specific measures identified. EI20
CS93 Automated process with (semi) closed system, CS38 Use in contained systems. CS8 Drum / batch transfers.	No other specific measures identified. EI20
CS101 Application of cleaning products in closed systems.	No other specific measures identified. EI20
CS45 Filling / preparation of equipment (from drums or containers), CS81 Dedicated facilities.	No other specific measures identified. EI20
CS37 Use in contained batch processes / CS76 Semi Automated process. (e.g.: Semi automatic	No other specific measures identified. EI20

application of floor care and maintenance products)	
CS4 Dipping, immersion and pouring	No other specific measures identified. EI20
CS42 Cleaning with low-pressure washers	No other specific measures identified. EI20
CS44 Cleaning with high pressure washers	No other specific measures identified. EI20
CS34 Manual / CS47 Cleaning / CS48 Surfaces / CS60 No spraying	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS67 Storage, CS137 Product sampling	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.72e2
Fraction of Regional tonnage used locally	5.8e-1
Annual site tonnage (tonnes/year)	1.0e2
Maximum daily site tonnage (kg/day)	5.0e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
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 [TCS1].	
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] Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR10].	
Treat air emission to provide a typical removal efficiency of (%)	70
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.9e5
Assumed domestic sewage treatment plant flow (m3/d)	2000

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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	5.1E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-02

4. Use as a fuel EC 232-366-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Use as a fuel	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 8a, 8b, 16
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 additives and additive components) 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
GEST_12I Use as a fuel, CS107 (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS8 Drum/Batch transfers	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	6.5e5
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	6.5e5
Maximum daily site tonnage (kg/day)	2.2e6
Frequency and duration of use	
Continuous release [FD2].	
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-3
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
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 [TCS1].	
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, additional onsite wastewater treatment required [TCR14].	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	93.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	00
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	5.0e6
Assumed domestic sewage treatment plant flow (m3/d)	2.7e+6
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2.6E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	8.0E-01

5. Use as a fuel EC 232-366-4 – Professional Sector

Section 1 Exposure Scenario	
Title	
Use as a fuel	
Use Descriptor	
Sector(s) of Use	NA
Process Categories	1, 2, 3, 8a, 8b, 16
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 additives and additive components) 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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
GEST_12I Use as a fuel, CS107 (closed systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS22 Transfer from/pouring from containers	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.5e6
Fraction of Regional tonnage used locally	5e-4
Annual site tonnage (tonnes/year)	1.3e3
Maximum daily site tonnage (kg/day)	3.4e3
Frequency and duration of use	
Continuous release [FD2].	
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) [OOC7]	1.0e-3
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
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 [TCR10].	
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
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.6e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-03
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-02

6 . Use as a fuel EC 232-366-4 – Consumer

Section 1 Exposure Scenario		
Title		
Use as a fuel		
Use Descriptor		
Sector(s) of Use	NA	
Process 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 worker exposure		
Product characteristics		
Physical form of product	Liquid	
Vapour Pressure (kPa)	Liquid, vapour pressure > 10Pa (STP) [OC15]	
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13	
Amounts used	Unless otherwise stated, covers use amounts up to 50000g [ConsOC2]; covers skin contact area up to 420cm2 [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]	
Other Operational Conditions Affecting Exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**	
PC13:Fuels--Liquid -: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to1500 g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - home heating fuel	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 1500g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 1000g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid : Garden Equipment - Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 420.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 1000g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
Section 2.2 Control of environmental exposure		

Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.3e5
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.2e1
Maximum daily site tonnage (kg/day)	3.2e2
Frequency and duration of use	
Continuous release [FD2].	
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) [OOC7]	1.0e-4
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.5e4
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.4E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.1E-02

7. Functional Fluids EC 232-366-4 – Industrial Sector

Section 1 Exposure Scenario	
Title	
Lubricants	
Use Descriptor	
Sector(s) of Use	n.a.
Process Categories	1, 2, 3, 4, 7, 8a, 8b, 9
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 4.6a.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers	
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 (kPa)	Liquid, vapour pressure 0.5 - 10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions Affecting Exposure	Assumes use at not more than 20°C above ambient temperatures, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3
CS14 Bulk transfers	No other specific measures identified. EI20
CS8 Drum/batch transfers	No other specific measures identified. EI20
CS84 Filling of articles/equipment	No other specific measures identified. EI20
CS107 (closed systems)	No other specific measures identified. EI20
CS45 Filling preparation of equipment from drums or containers	No other specific measures identified. EI20
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS19 Remanufacture of reject articles	No other specific measures identified. EI20
CS5 Equipment maintenance	No other specific measures identified. EI20
CS67Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.1e1
Fraction of Regional tonnage used locally	4.8e-1

Annual site tonnage (tonnes/year)	1e1
Maximum daily site tonnage (kg/day)	5e2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-5
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 [TCS1].	
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] Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR10].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	95.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.9e4
Assumed domestic sewage treatment plant flow (m3/d)	2000
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.[ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Section 3 Exposure Estimation	
3.1 Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2 Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1 Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using	

onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-04
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.2E-02