

Material Safety Data Sheet

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

FUELS, DIESEL

Q8 Quaser s.r.l.



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

1.1 Product identifier

Product name:	Fuel Diesel
Synonym	Fuel Diesel (all types)
CAS Number	not applicable (mixture)
EC Number	not applicable (mixture)
Index number	not applicable (mixture)
Registration number	not applicable (mixture)
Molecular formula	not applicable (mixture)
Molecular weight	not applicable (mixture)
Unique Formula Identifier (UFI)	

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

Relevant identified uses: Use in fuels (fuel for engines) and other industrial uses

Identified uses in the chemical safety report: generic list of applications:

Life cycle:

Manufacture*:	Manufacture of substance
Formulation or re-packing:	Formulation & (re)packing of substances and mixtures
Uses at industrial sites:	Use in fuels
Widespread uses by professional workers:	Use in fuels
Consumer uses:	Use in fuels
Uses advised against:	The uses of substances are the uses are indicated above. Other uses are not recommended.
Reasons why uses advised against:	Do not utilize the product for other uses, besides the relevant identified uses, unless an assessment is completed, prior to commencement of that use, which demonstrates that the use will be controlled. Such additional assessment is the responsibility of the individual registrant.

See section 16 for a complete list of uses, and use descriptors, for which an ES is provided as an annex

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

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1.4 Emergency number

For Appropriate National Emergency Information Services see the following link:

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

SECTION 2. HAZARDS IDENTIFICATION

Physico-chemical hazards: Flammable liquid and vapour

Human health hazard: Causes skin irritation, harmful if inhaled, may be fatal if swallowed and enters airways, suspected of causing cancer, may cause damage to organs through prolonged or repeated exposure.

Environmental hazard: Toxic to aquatic life with long lasting effects.

2.1 Classification of the substance or mixture

Flam. Liq. 3 H226

Asp. Tox. 1: H304

Skin Irrit. 2 H315

Acute Tox 4 H332

Carc.2: H351

STOT RE 2 H373 (liver, thymus, bone marrow)

Aquatic Chronic 2 H411

Note: classification of the substance has been performed considering the following: Viscosity $\leq 20,5$ mm²/s at 40 °C and flash point ≥ 23 °C and ≤ 75 °C

Full text of hazard statements And EUH-phrases: see section 16

2.2 Label elements



Signal Word: Danger

Hazard Statement(s): H226: Flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H332: Harmful if inhaled.
H351: Suspected of causing cancer.

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H373: May cause damage to organs through prolonged or repeated exposure (liver and thymus, bone marrow)

H411: Toxic to aquatic life with long lasting effects.

Precautionary Statement(s): Prevention:

P201: Obtain special instruction before use

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/hearing protection/

Response:

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P331: Do NOT induce vomiting.

Disposal:

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

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

Supplemental hazard information

Supplemental hazard statements: n.a

Authorization number: n.a.

2.3 Other hazards

Hot product may form explosive and flammable vapour-air. The vapour product is heavier than air and in the event of a leak, vapour may accumulate in confined spaces and low lying areas where it may easily be accidentally ignited and can create fire and explosion risks even from a distance. There is a risk of thermal burns in case of direct contact with skin or eyes when the product is handled at high temperature.

The product could meet some PBT or vPvB classification criteria set out in Annex XIII of REACH (see 12.5 point)

No components identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605. See also sections 9 to 12.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Components	% w/w	CE	CAS	Index	Registration	Classification
FUELS DIESEL ¹	0-100	269-822-7	68334-30-5	649-224-00-6 (Note N)	01-2119484664-27-XXXX	Flam. Gas 3; H226 Asp. Tox. 1; H304 Skin Irrit.2; H315 Acute Tox 4; H332 Carc.2; H351 STOT Rep.Exp.2: H373 Aquatic Chronic 2; H411
Petroleum gas oil, co-processed with renewable hydrocarbons of plant and/or animal origin ²	0-5	941-364-9			01-2120091562-55-XXXX	Flam. Liquid 3; H226 Asp. Tox. 1; H304 Skin Irrit. 2; H315 Acute Tox 4; H332 Carc.2; H351 STOT RE 2; H373 (timo, fegato, midollo osseo) Aquatic Chronic 2; H411
Renewable hydrocarbons (diesel type fraction)	0-20	700-571-2			01-2120043692-58-XXXX	Flam. Liquid 3; H226 Asp. Tox. 1; H304 EUH066
BIODIESEL (methyl esters of fatty acids)	0-7	272-606-8 267-007-0 267-015-4	68990-52-3 67762-26-9 67762-38-3	-	01-2119485821-32-0031 01-2119471662-36-0024 17-2119848856-20-0000	Not classified

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

- Eye contact:** Rinse cautiously with water for several minutes, remove contact lenses, if present and easy to do so. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens
- Skin contact:** Remove contaminated clothing, contaminated footwear and dispose of safely. Wash area with soap and water for 10 to 15 minutes
- Swallowing:** Do not induce vomiting as there is high risk of aspiration. Do not give anything by mouth to an unconscious person. If vomiting occurs, the head should be kept low so that the vomit does not enter the lungs (aspiration)

¹ UVCB substance "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 C20 and boiling in the range of approximately 163°C to 357°C"

² A complex combination of hydrocarbons produced by the co-processing (hydrotreating) of a petroleum gas oil with vegetable oils and/or animal fats. It consists predominantly of linear alkanes, branched alkanes, cyclic alkanes and monoaromatic hydrocarbons. The carbon numbers are predominantly in the range of C9 – C26.

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Inhalation: If breathing is difficult, remove victim to fresh air. Monitor for respiratory distress, administer oxygen and assist ventilation as required. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Check vital signs regularly and act accordingly

4.2 Most important symptoms and effects, both acute and delayed

Skin contact symptoms: may cause skin irritation,

Eye contact symptoms: may cause mild reversible eye irritation.

Inhalation symptoms of vapours: may cause headache, nausea, dizziness. Acute, high dose exposure may cause: central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias

Ingestion (swallowing) symptoms: altered state of consciousness and loss of coordination

4.3 Indication of any immediate medical attention and special treatment needed

In case of ingestion, always assume that aspiration has occurred. Send the casualty immediately to hospital. Do not wait for symptoms to develop.

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

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

Large fires: foam , 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), 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).

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SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For NON-emergency 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)

For emergency 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. 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

Soil: 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. If it is necessary to store any contaminated materials for safe disposal, only suitable containers (airtight, labelled, sealed, waterproof, earthed and bonded) should be used.). In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.

Water: In case of small spillages in closed waters (i.e. ports). In case of small spillages in closed waters, contain product with floating barriers or other equipment). Large spillages. If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities). If possible, collect the product and contaminated materials with mechanical means, and store/dispose of according to relevant regulations.

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.

6.4 Reference to other sections

For more information regarding protective equipment and operational conditions see the section "Exposure control and personal protection".

SECTION 7. HANDLING AND STORAGE

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7.1 Precautions for safe handling

7.1.1 Protective measures (containment and preventive measures)

Ensure that all relevant regulations regarding handling and storage facilities of flammable products are followed. Take precautionary measures against static electricity. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid contact with skin and eyes. Do not ingest. Do not breathe vapours

Use and store only outdoors or in a well-ventilated area. Avoid contact with the product. Use adequate personal protective equipment as needed. Do not use compressed air for filling, discharging, or handling operations. Prevent the risk of slipping. Avoid release to the environment.

For more information regarding protective equipment and operational conditions see Exposure scenarios.

7.1.2 General recommendations on 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. Avoid contact with skin. Do not eat, drink or smoke when using this product. Wash the hands thoroughly after handling.

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. After cleaning of tanks and 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. Store in a well-ventilated place.

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. Protect from the sunlight. Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Empty containers may contain combustible product residues. Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.

7.3 Specific end uses

See attached exposure scenarios

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Component	Occupational exposure limit values	Reference
FUELS, DIESEL	TLV®-TWA: 100 mg/m ³	ACGIH 2023

Recommended Monitoring procedures: refer to Dir 98/24/EC. Good industrial health practices in the work place

DNEL (Derived No Effect Level): Hazard conclusions

Route	DNEL for workers				DNEL for the general population			
	Systemic effects Long term	Systemic effects Acute	Local effects Long term	Local effects Acute	Systemic effects Long term	Systemic effects Acute	Local effects Long term	Local effects Acute
Oral	n.a.	n.a.	n.a.	n.a.	DNEL 1.25 mg/kg Most sensitive end point: Repeated dose toxicity (dermal)	No hazard identified	n.a.	n.a.
Dermal	DNEL 2.91 mg/kg Most sensitive end point: Repeated dose toxicity (dermal)	No hazard identified	High hazard (no threshold derived)*	Low hazard (no threshold derived)*	DNEL 1.25 mg/kg Most sensitive end point: Repeated dose toxicity (dermal)	No hazard identified	High hazard (no threshold derived)*	Low hazard (no threshold derived)*
Inhalation	DNEL 68,34 mg/m ³ Most sensitive end point: Developmental toxicity teratogenicity	DNEL 4288 mg/m ³ Most sensitive end point: Acute toxicity (inhalation)	No hazard identified	No hazard identified	DNEL 20,22 mg/m ³ Most sensitive end point: Developmental toxicity teratogenicity (Dermal)	DNEL 2572.8 mg/m ³ Most sensitive end point: Acute toxicity (inhalation)	No hazard identified	No hazard identified
Eyes	n.a.	n.a.	n.a.	No hazard identified	n.a.	n.a.		No hazard identified

* For chronic exposures (dermal carcinogen): no threshold effect and/or dose-response information available.

** The value cannot be calculated due to the lack of a dose-response curve; substance is classified as irritating

PNEC(S) (Predicted No Effect Concentration)

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PNEC(S) (Predicted No Effect Concentration)

PNEC(S) Water and sediments 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

Minimise 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. Eye washes and emergency showers

8.2.2 Individual protection measures, such as personal protective equipment

- (a) Eye/face protection:** If splashing is likely, full head and face protection (protective shield and/or safety goggles) should be used. (EN 166)
- (b) Skin protection:**
- i) Hand protection: 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. 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 antistatic working clothes with long sleeves in relation to the risks related to the classification of work areas. In the case, refer to UNI EN 465-466-467. In case of contamination of clothing, immediately replace and clean them.
- (c) Respiratory protection:** Open or well-ventilated spaces: if the product is handled without adequate containment means for the vapours: full or half-face gas mask with filter for organic vapours (A) UNI EN14387:2021. In confined spaces, if exposure levels cannot be determined or estimated with adequate confidence, or an oxygen deficiency is possible, only SCBA's should be used. UNI 11719:2018.
- (d) Thermal hazards:** see point b



8.2.3 Environmental exposure controls

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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. For further details see individual exposure scenarios. The attached scenarios show the operational conditions and risk management measures to ensure exposure levels below the DNEL (Health) and PNEC (Environment) reference values.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Physical state	liquid
b)	Color	red, green, yellow
c)	Odor	Petroleum odor
d)	Melting point/freezing point	From -40 to +6°C (Concawe, 2010a for HVGO date category EC 269-822-7) -6°C (ASTM D-97 – range from < -20 to -4°C EC941-364-9)
e)	Boiling point or initial point and boiling range	From 141 to 462°C (Concawe, 2010a for HVGO date category EC 269-822-7) 160°C (ASTM D-2887 – range from 160 to 360°C EC941-364-9)
f)	Flammability	Flammable liquid
g)	Lower and upper explosion limit	LEL 1% UEL 6% Table GA-1 CEI31-35
h)	Flash point	>56 °C (CONCAWE, 2010a), CSR EC 269-822-7 79°C at 1013 hPa, EN ISO 2719, CSR EC 941-364-9
i)	Auto-ignition temperature	>225°C (Concawe, 2010a for HVGO date category EC 269-822-7) 222°C at 1013 hPa, EU A.15. CSR EC 941-364-9
j)	Decomposition temperature	Data not applicable
k)	pH	Data not applicable
l)	Kinematic Viscosity	≥1,5 mm ² /s (Concawe, 2010a for HVGO date category EC 269-822-7) 3.9 mm ² /s (static) at 20°C CSR EC 941-364-9
m)	Solubility	Not applicable: substance is a hydrocarbon UVCB
n)	Partition coefficient: n-octanol/water (log value)	Log Kow (Log Pow): 5.7 CSR EC 941-364-9
o)	Vapor pressure	0.4 kPa at 40 °C (CONCAWE 1996, for HVGO date category EC 269-822-7) 0.4 kPa at 25 °C (ASTM D—1120-72) CSR EC 941-364-9
p)	Density and/or relative density	0.8-0.91 g/cm ³ (Concawe, 2010a for HVGO date category EC 269-822-7) 0.845 at 20°C ASTM D-4052 CSR EC 941-364-9
q)	Relative vapor density	Data not available
r)	Particle characteristics	Not applicable

Note: the above data refer to the main component of the mixture (UVCB substance: Gas oil EC 269-822-7 and EC 941-364-9)

9.2 Other information

None

9.2.1 Information with regard to physical hazard classes

The mixture is a flammable liquid

9.2.2 Other safety characteristics

The vapour product is heavier than air and in the event of a leak, vapour may accumulate in confined spaces and low lying areas where it may easily be accidentally ignited and can create fire and explosion risks even from a distance

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SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

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

10.2 Chemical stability

This product 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/sparks/open flames/hot surfaces. Do not smoke. 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

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SECTION 11. TOXICOLOGICAL INFORMATION

Note: the information below refers to the main components (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5) belonging to the diesel fuel category VGOs/HGOs/Distillate Fuels

Information on toxicokinetics on metabolism and distribution

No experimental data were located on the toxicokinetics of gas oils in vivo. Physico-chemical considerations also suggest that highly respirable aerosols of poorly water soluble substances with a log Pow greater than zero will be absorbed to some extent from the respiratory tract. In the absence of further guidance, it will be assumed that 50% of an inhaled dose of aerosolized gas oil will be absorbed by the lung in animals and humans. No measured data are available on the dermal absorption of gas oils, however the occurrence of systemic tissue changes in repeated dose toxicity studies indicates that some absorption across the skin is possible. Results from the SKINPERM model indicate that uptake of gas oil across the skin is likely to be low, with an estimated dermal flux of 0.0001058 mg cm⁻². hour for human skin. However the reliability of this value is not known, and therefore complete absorption of gas oil by human skin has been assumed.

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

a) Acute toxicity:

Acute Oral Toxicity:

Toxicity was evaluated on samples of products in this category, VGOs/HGOs/Distillate fuels, (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). These studies have shown an oral LD50 > 2000 mg/kg bw. Therefore VGOs/HGOs/Distillate Fuels are not classified for acute oral toxicity in according according to EU regulations.

The results of experimental studies are summarized in the following table data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
RAT (M/F) (Sprague-Dawley) oral: gavage OECD Guideline 420	LD50: 21.1 mL/kg bw (male/female) (approx 17.900 mg/kg bw)	1 (reliable without restriction) key study CAS 68334-30-5	American Petroleum Institute (API) 1980
RAT (M/F) (Sprague-Dawley) oral: gavage equivalent or similar to OECD Guideline 420	LD50: 9 mL/kg bw (male/female) (approx 7600 mg/kg bw)	1 (reliable without restriction) supporting study study CAS 68334-30-5	American Petroleum Institute (API) 1980b

The component EC 700-571-2 (renewable hydrocarbons diesel-type fraction) has an oral LD50 RAT ≥ 2000 mg/kg of body weight (EU Method B.1 - Mullaney T., 2005) (Read-across)

Acute Inhalation Toxicity

Animal studies (rabbits) are available for samples of products in this category, VGOs/HGOs/Distillate fuels, EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). Based on results of these studies, VGOs/HGOs/Distillate fuel sare classified as harmful by inhalation, Acute Tox 4 H332, with an LC50 of 4.1 mg/L (aerosol) in according to EU regulations.

The results of experimental studies are summarized in the following table, data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
RAT (M/F) inhalation: aerosol and vapour mixture OECD Guideline 403	LC50 (4 h): 3.6 mg/L air (female) LC50 (4 h): 5.4 mg/L air (male) LC50 (4 h): 4.1 mg/L air (male/female)	1 (reliable without restriction) key study CAS 68334-30-5	ARCO (1988a)

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Acute Dermal Toxicity

Toxicity was evaluated on samples of products in this category, VGOs/HGOs/Distillate fuels, EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). These studies have shown an dermal LD50 > 2000 mg/kg bw. Therefore VGOs/HGOs/Distillate Fuels are not classified for acute dermal toxicity in according according to EU regulations.

The results of experimental studies are summarized in the following table data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
RABBIT Coverage: occlusive equivalent or similar to OECD Guideline 434 (Acute Dermal Toxicity - Fixed Dose Procedure)	LD50: > 5 mL/kg bw (male/female) ((approx > 4300 mg/kg bw/day))	1 (reliable without restriction) key study experimental result CAS68334-30-5	API (1980b)

The EC 700-571-2 component (Renewable hydrocarbons (diesel type fraction) has a dermal LD50 RABBIT \geq 2000 mg/kg (EU Method B.3 - Sanders, A, 2006) (Read-across)

b) Skin corrosion/irritation:

No specific studies have been reported on corrosivity of UVCB substances of this category gasoil VGOs/HGOs/Distillate. Considering the available studies, no corrosive action of these substances is expected.

Animal studies (rabbits) demonstrate that these products may act as a skin irritant. Most of the studies and the overall weight of evidence indicates that VGOs/HGOs/Distillate fuels (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5) are irritating to skin and are classified as irritating to the skin according to EU regulations (Skin irritant: H315)

The results of experimental studies are summarized in the following table, data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
RABBIT (New Zealand White) OECD Guideline 404	irritating Erythema score: 3.9 of max. 4 (mean) (Time point: 24 and 72 hours) (intact skin) Edema score: 2.96 of max. 4 (mean) (Time point: 24 and 72 hour) (intact skin)	2 (reliable with restrictions) key study sample CAS 68334-30-5	API (1980b)

c) Serious eye damage/irritation:

Multiple studies were available to assess the skin irritation potential of VGOs/HGOs/Distillate fuels, (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). Animal studies (rabbits) demonstrate that these products are not irritating to eyes. None of the hazard assessments of kerosine and jet fuel constituents have resulted in classification for eye irritation.

The results of experimental studies are summarized in the following table data valid for both UVCB 269-822-7 and 294-364-9):

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Method	Results	Remarks	Reference
RABBIT OECD 405	not irritating Cornea score: 0 of max. 80 (mean) (Time point: 24, 48, 72 hours) (unrinsed) Iris score: 0 of max. 10 (mean) (Time point: 24, 48, 72 hours) (unrinsed) Conjunctivae score: 0 of max. 20 (mean) (Time point: 24, 48, 72 hours) (unrinsed)	1 (reliable without restriction) key study CAS68334-30-5	API (1980b)

d) Respiratory or skin sensitization

Respiratory system: This endpoint is not a REACH requirement. Furthermore no data were available for this endpoint.

Skin: Multiple studies were available to assess the skin sensitising potential of VGOs/HGOs/Distillate fuels, (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). Based on test data, there was no evidence of skin sensitization, VGO/Hydrocracked/Distillate fuels are not classified as sensitising to the skin according to EU DSD.

The results of experimental studies are summarized in the following table data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
Guinea pig (Hartley) male Buehler test OECD Guideline 406	Not sensitising	1 (reliable without restriction) key study CAS 68334-30-5	American Petroleum Institute (API) 1980

e) Germ cell mutagenicity:

The weight of evidence from in vitro and in vivo mutagenic studies indicates that VGOs/HGOs/Distillate fuels, (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5) are likely not mutagens, therefore, no classification is given in the legislation on dangerous substances.

The results of experimental studies are summarized in the following table data valid for both UVCB 269-822-7 and 294-364-9):

Method	Results	Remarks	Reference
In vitro data			
In vitro genic mutation in Salmonella thyphimurium TA 1535, TA 1537, TA 98, TA 100 and E. coli WP2 (Test di Ames) Dose: 5000 µl/plate OECD Guideline 471	Negative	Key study Reliable without restriction (Distillates (petroleum), solvent-refined light paraffinic)	Covance Study director 2021
In vitro genic mutation in Salmonella thyphimurium TA 98 Doses: 0, 12, 24, 36, 48, 60 µl/plate OECD Guideline 471	Negative	Key study Reliable without restriction CAS: 64741 -43 -1	May K.(2013)

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Method	Results	Remarks	Reference
Chromosome aberration assay RAT (M/F) intraperitoneal 300, 1000, or 3000 mg/kg (nominal conc.) equivalent or similar to OECD Guideline 475 (Mammalian Bone Marrow Chromosome Aberration Test)	Negative	1 (reliable without restriction) key study CAS 64741-44-2	API (1985a)
Micronucleus assay (chromosome aberration) MOUSE (M/F) oral equivalent or similar to OECD Guideline 474 (Mammalian Erythrocyte Micronucleus Test)	Negative	2 (reliable with restrictions) key study CAS 68476-30-2	McKee, R.H., Amoruso, M.A., Freeman, J.J., Przygoda, R.T. 1994

f) Carcinogenicity

VGO/Hydrocracked/Distillate Fuels, (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5) exhibited varying levels of activity in carcinogenicity testing with some materials demonstrating low carcinogenic potential and others a marked response both in the presence of severe irritation. Carcinogenic activity is reported in the presence of repeated dermal irritation, which could be prevented by limiting irritation. However, in view of the questionable adequacy of the PAH analysis and the high levels of phenanthrene and pyrene found in some samples tested in the key study, it is uncertain whether a genotoxic mechanism can be ruled out. Therefore VGO/Hydrocracked/Distillate fuels are classified as Carc.2 H351 in according to EU regulations.

The results of experimental studies are summarized in the following table:

Method	Results	Remarks	Reference
MOUSE male 25 µL (amount applied) Exposure: Lifetime (three times a week) Compound was applied dermally 3 times a week for the lifespan of the animal (only male mice used) and animals were examined for dermal tumours. Animals were examined grossly for internal tumours at the end of the study period.	Neoplastic effects (skin tumour development)	1 (reliable without restriction) key study	Biles, R.W., McKee, R.H., Lewis, S.C., Scala, R.A., DePass, L.R. (1988)

g) Reproductive toxicity

Effects on fertility

No guideline or near guideline studies were located on Vacuum Gas Oils, Hydrocracked Gas Oils & Distillate Fuels (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5) on reproductive function. Some indication of the likely effect of a test substance on reproductive organs can be gained from the results of repeated-dose toxicity studies with members of similar categories. Based on the test results from 11 studies, it is considered unlikely that exposure to substances in this category will affect reproductive performance.

The following is a summary of the more representative studies reported in the Registration dossier.

Method	Results	Remarks	Reference
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RAT (Sprague-Dawley [rat]) M/F two-generation reproductive toxicity - oral: gavage Doses / Concentrations: 50 mg/kg/day (25 mg/ml) Doses / Concentrations: 250 mg/kg/day (125 mg/ml) Doses / Concentrations: 1000 mg/kg/day (500 mg/ml)	F1 generation NOAEL : 1000 mg/kg bw/day Not specified Lowest effective dose / concentration Relation to other toxic effects:	1 (reliable without restriction) Supporting study Test material 848301-69-9 /	Reference B Faiola 2011
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Effects on Developmental

Developmental studies only observed developmental effects at doses that caused maternal toxicity and the developmental effects cannot be separated from the maternal effects; therefore, there is no appropriate developmental classification.

The results of experimental studies are summarised in the following table:

Method	Results	Remarks	Reference
RAT (Sprague-Dawley [rat]) dermal Doses / Concentrations: 30, 125, 500 or 1000 mg/kg/day Exposure: 20 days (Daily) equivalent or similar to guideline OECD Guideline 414 (Prenatal Developmental Toxicity Study)	Maternal animals: NOAEL: 125 mg/kg bw/day (actual dose received) NOAEL: 125 mg/kg bw/day Fetuses: Fetal abnormalities not specified localisation: NOAEL: 125 mg/kg bw/day Overall developmental toxicity: not specified Lowest effective dose / concent	2 (reliable without restriction) key study experimental result Test material CAS 64741-49-7	Mobil 1989

h) STOT-single exposure

Data not available

i) STOT-repeated exposure:

No repeat-dose toxicity studies were located for oral toxicity of VGOs/HGOs/Distillate fuels (EC 269-822-7 and EC 941-364-9/CAS 68334-30-5). However, supporting information is available, with two studies conducted on petroleum substances in other categories; a sub-chronic study on a Kerosine (CAS 8008-20-6) and a chronic study on a Highly Refined Base Oil (CAS 8042-47-5).

Value used for CSA

For sub-chronic inhalation toxicity of VGOs/HGOs/Distillate fuels, a conservative sub-chronic NOAEC of 880 mg/m3 was determined for local effects on the lung (increased relative wet weight in the absence of histopathological change). A NOAEC of >1710 mg/m3 was established for systemic effects, based on no significant findings at this level (OECD 413). A NOAEL of 30 mg / kg / day by the dermal exposure route, associated with liver and thymus effects.

In accordance with column 2 of REACH Annex IX, a chronic repeated dose study by the oral route (sub-chronic study 90 days) is not necessary because the primary routes of exposure for humans are the dermal and inhalation routes. One oral sub-chronic study is proposed on a VHGO substance containing high levels of PAH constituents.

The overall weight of evidence indicates that VGOs/HGOs/Distillate fuels are classified as stot Rep.Exp.2 H373 in according to CPL regulations.

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The following is a summary of the more representative studies reported in the Registration dossier.

Method	Results	Remarks	Reference
Inhalation			
RAT (M/F) subchronic (inhalation: aerosol) Exposure: 13 weeks OECD Guideline 413	NOAEC (Systemic effects): > 1.71 mg/L (male/female) NOAEC (Local effects): 0.88 mg/L (male/female) (Lung weight)	2 (reliable with restrictions) key study Diesel fuel	Lock, S., Dalbey, W., Schmoyer, R., Griesemer, K. (1984)
Dermal			
RAT (M/F) subacute OECD Guideline 410	NOEL (systemic): 0.5 ml/kg (male/female) NOEL: 0.0001 ml/kg (male/female) (based on dermal irritation)	2 (reliable with restrictions) key study CAS 68334-30-5	ARCO (1992e)
RAT (M/F) Subchronic exposure: continuous exposure for 13 weeks (Five days per week) OECD Guideline 411	NOAEL: 30 mg/kg bw/day (male/female) (clinical signs; body weight; haematology; clinical chemistry; organ weights)	2 (reliable with restrictions) key study experimental result Test material CAS64741-49-7	Mobil (1989a)
Oral			
RAT (M/F) sub-chronic toxicity: oral (oral: gavage) Exposure: Males were treated for 70 to 90 days. Females were treated for 21 weeks. (Daily) OECD Guideline 408	NOAEL: 750 mg/kg bw/day (actual dose received) (female) body weight	Supporting study (reliable without restriction)	Mattie, D.R., Marit, G.B., Cooper, J.R., Sterner, T.R., Flemming, C.D. 2000

The component EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)), has a NOAEL (oral, rat, 90 days) \geq 1000 mg/kg body weight/day (OECD 408 - (Read-across) (Dhinsa, NK; Brooks, P and Watson, P; 2009

j) aspiration hazard:

Since all UVCB components of the mixture have a low viscosity, <20,5 mm² at 40 °C, may cause risk of aspiration into the lungs during swallowing or subsequent vomiting with lung inflammation (chemical pneumonitis). VGOs/HGOs/Distillate fuels are classified in according to EU regulations: Asp. Tox. 1 H304.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

None of the components have properties of interference with the endocrine system.

The components UVCB 269-822-7 and 294-364-9 have moderate ability to provoke photo irritation.

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SECTION 12: ECOLOGICAL INFORMATION

The informations in this section are of the UVCB substance CAS number 68334-30-5. According to the information below (toxicity short/long term to fish invertebrates algae and aquatic plants, biodegradation etc), this product is classified as: Aquatic Chronic 2 H411.

12.1 Toxicity

The results of experimental studies are summarized in the following table:

Endpoint	Results	Remarks
Daphnia magna Aquatic invertebrates Short-term toxicity	EL50 (48 h): 68 mg/L NOEL (48 h): 46 mg/L	Girling, A; Cann, B. (1996b) Key study CAS 68334-30-5 reliable without restriction
Daphnia magna Aquatic invertebrates Long- term toxicity	NOEL (21 d): 0.2 mg/L	Redman, et al. (2010b) key study (Q)SAR reliable with restrictions
Daphnia magna Aquatic invertebrates	EL50 48/h: ≥ 100 mg/l	EC 700-571-2 (Renewable hydrocarbons (diesel type fraction) Read-Across - OECD 202) (Goodband, TJ, 2005)
	NOEC 21/days > 1 mg/l	EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)) Read-Across - Daphnia Magna) (Sewell IG, 2008)
Algae Pseudokirchnerella subcapitata Short-term toxicity	EL50 (72 h): 10 mg/L NOEL (72 h): 1 mg/L	Girling, A.; Cann, B. (1996b) Key study CAS 68334-30-5 reliable with restrictions
Alge Scenedesmus subspicatus	EL50 72/h ≥ 100 mg/l	EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)) Read-across - OECD 201 (Vryenhoef V, 2005)
Fish Oncorhynchus mykiss Short-term toxicity	LL50 (96 h): 21 mg/L NOEL (96 h): 10 mg/L	Reference Clark, R et al 2003 Palmer, A. G. 2001 key study CAS 68334-30-5 reliable with restrictions
Fish Oncorhynchus mykiss	LL50 96/h: ≥ 1000 mg/l	EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)) Read-across - OECD 203) (Goodband, TJ, 2005)
Fish Oncorhynchus mykiss Long- term toxicity	NOEL (14 d): 0.083 mg/L	Redman, et al. (2010b) key study (Q)SAR reliable with restrictions

12.2 Persistence and degradability

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Abiotic degradation: Hydrolysis: the available data and available weight of evidence demonstrate that these products 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.

Phototransformation in air: this endpoint is not a REACH requirement.

Phototransformation in water/soil: this endpoint is not a REACH requirement.

Biodegradation

EC 269-822-7/ CAS 68334-30-5 (fuels, diesel, gasoil): the main constituents of the product are to be considered "inherently" biodegradable, but not "readily" biodegradable: therefore they may be moderately persistent, particularly in anaerobic: Biodegradation: 60 % (28 days, OECD Guideline 301 F)

EC 941-364-9 (fraction of petroleum gas oil, co-processed with renewable hydrocarbons of vegetable and/or animal origin: slightly biodegradable. Biodegradation: 57% (28 days, OECD Guideline 301 F)

EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)) readily biodegradable. Biodegradation: 82 % (28 days) (OECD 301B -Read-across) (Clarke, N, 2008)

12.3 Bioaccumulative potential

EC 269-822-7/ CAS 68334-30-5 (fuels, diesel, gasoil): Log Pow: 3.6 - 6 Range of values for the main constituents of gasoil (categories of hydrocarbons). The test methods for this endpoint are not applicable to UVCB substances.

EC 941-364-9 (Petroleum gasoil fraction, co-processed with renewable hydrocarbons of plant and/or animal origin): Log Pow: 5.7. The test methods for this endpoint are not applicable to UVCB substances.

EC 700-571-2 (Renewable hydrocarbons (diesel type fraction)) Log Kow: \approx 8.4 (20 °C - EU A8. . The test methods for this endpoint are not applicable to UVCB substances.

12.4 Mobility in soil

Adsorption Coefficient (K_{oc}): 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

Some samples of the UVCB substance EC269-822-7 may contain substances listed on the SVHC list as PBT/vPvB at concentrations above 0.1% (IPA - Concawe_Evaluation of PBT for Petroleum Hydrocarbons , Revision 2 Juli 2019)). No other representative hydrocarbon structures were found that meet the PBT/vPvB criteria (CSR Concawe 2022)

In the samples of the UVCB substance EC941-364-9 no PBT/vPvB components were detected in concentration higher than 0.1% (CSR CoRAP 2022)

12.6 Endocrine disrupting properties

No component with properties endocrine-disrupting properties.

12.7 Other adverse effects

This product may contribute to ozone formation in the near surface atmosphere.

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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 official regulations. European Waste Catalogue code(s) (Decision 2001/118/CE): 13 07 01* – 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 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: dispose of 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

Regulations applicable to road transport

ADR Agreement, Annexes A and B

Regulations applicable to rail transport

COTIF Convention, Appendix C, RID Regulation

Regulations applicable to inland waterway transport

ADN Agreement, Annex

Regulations applicable to maritime transport

IMDG Code

Regulations applicable to air transport

ICAO Technical Instructions

IATA DGR Manual

14.1 UN number or ID number

UN 1202

14.2 UN proper shipping name

Italiano: GASOLIO / CARBURANTE DIESEL / OLIO DA RISCALDAMENTO LEGGERO

Inglese: GAS OIL / DIESEL FUEL / HEATING OIL, LIGHT

14.3 Transport hazard class(es)

Road transport (ADR):

Class: 3

Subsidiary hazards: -

Railway transport (RID):

Class: 3

Subsidiary hazards: -

Inland waterways transport (ADN):

Class: 3

Subsidiary hazards: N2, F

Sea transport (IMDG):

Class: 3

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Subsidiary hazards: -

Air transport (IATA):

Class: 3

Subsidiary hazards: -

14.4 Packing group

PG: III

14.5 Environmental hazards

Road transport (ADR): Environmentally hazardous

Railway transport (RID): Environmentally hazardous

Inland waterways transport (ADN): Environmentally hazardous

Sea transport (IMDG): Marine Pollutant (MP)

Air transport (IATA): Environmentally hazardous

14.6 Special precautions for user

Carriage, 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.

Ensure that the transfer of the material under conditions of containment or extraction ventilation.

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.

Further prescriptions are reported in the applicable regulations.

General additional information

Mark and labeling: MODEL No. 3 LABEL + ENVIRONMENTALLY HAZARDOUS
(except packaging or carriage in exemption) SUBSTANCE MARK

Additional information on road transport (ADR)

Transport category according to ADR 1.1.3.6: 3
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)

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Emergency Schedules

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 IMO instruments

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

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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): the substance is not subjected.
- Restrictions according to REACH Regulation (Title VIII): Annex XVII Entry 3, 40, 75

Other UE and National Regulations:

- The substance is dangerous under the Seveso Regulation (Dir. 2012/18/UE):
- Annex 1, part 1: Category P5c-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 f.a. (chemical agents)*: product subject
- *Directive 2004/37/EC and f.a. (Carcinogens, mutagens or reprotoxic substances)*: product not subject
- Dispose wastes and contaminated packaging according to official regulations.

15.2 Chemical safety assessment

Chemical safety assessment has been carried out for the components:

EC 269-822-7/ CAS 68334-30-5 (fuels, diesel, gasoil)

EC 941-364-9 ((Petroleum gasoil fraction, co-processed with renewable hydrocarbons of plant and/or animal origin):

EC 700-571-2 (Renewable hydrocarbons (diesel type fraction))

SECTION 16. OTHER INFORMATION

List of relevant hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H351: Suspected of causing cancer.

H373: May cause damage to organs through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

EUH066: Repeated exposure may cause skin dryness or cracking

Advice on any training appropriate for workers:

Properly train all workers that are potentially exposed to this substance on the basis of the contents of this safety data sheet.

Note to the CLP classification of mixtures: procedure used

Calculation method

Key literature references and sources for data:

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REACH registration dossier for EC 269-822-7

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

SDS of the supplied raw materials.

Legend of abbreviations and acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CSR: Chemical Safety Report

DNEL: Derived No effect Level

DMEL: Derived Minimal Effect Level

EC50: Half maximal effective concentration

IC50: Half maximal inhibitory concentration

LC50: Lethal concentration, 50%

LD50: Median lethal dose

PNEC: Predicted No Effect Concentration

PBT: Persistent, Bioaccumulative and Toxic substance

STOT: Specific Target Organ Toxicity

(STOT) RE: Repeated Exposure

(STOT) SE: Single Exposure

TDLO: Lowest published toxic dose

TLV: Threshold Limit Values

vPvB: Very Persistent and Very Bioaccumulative

Note N – The harmonised classification as a carcinogen applies unless the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen, in which case a classification in accordance with Title II of this Regulation shall be performed also for that hazard class.

Safety Data Sheet in according to Annex II of EC Regulation no. 1907/2006 and subsequent amendments (amended by Reg.878/2020)

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
Addition of new precautionary statement P210 and P273
Deletion of Note H
Section 8 updated
Section 14 updated
Section 15, subsection 15.1 updated
Exposure scenario updated

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Revision Number: 02
Revision Date: 15/02/2018
Grounds for review: Section 14 updated

Revision Number: 03
Revision Date: 29/07/2019
Grounds for review: Section 1 updated
Section 3 updated
Section 8 updated
Section 16
Exposure scenario updated

Revision Number: 04
Revision Date: 24/05/2021
Grounds for review: Section 14 updated

Revision Number: 05
Revision Date: 26/01/2023
Reasons for review Rev05 (15/12/2022): update of sections 1, 2, 3, 4, 8, 9, 11, 12, 14, 15, 16 and exposure scenarios.
Updated the format as the latest update Regulation CE n. 1907/2006 and f.a.

Revision Number: 06
Revision Date: 19/16/2023
Reasons for review Rev06 (19/06/2023): update of sections 2, 3, 8, 12, 15.

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Annex 1

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Exposure scenarios for EC 269-822-7

Identified Use	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
01 – Manufacture of Substance	Manufacture	-	-	1, 2, 3, 4, 8a, 8b, 9, 15, 28	1	ESVOC SpERC 1.1.v1
02 - Formulation & (re)packing of substances and mixtures	Formulation	-	-	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 28	2	ESVOC SpERC 2.2.v1
12a - Use in fuel; industrial	Industrial	-	-	1, 2, 8a, 8b, 16, 28	7	ESVOC SpERC 7.12a.v1
12b - Use in fuel; professional	Professional	-	-	1, 2, 8a, 8b, 16, 28	9a, 9b	ESVOC SpERC 9.12b.v1
12c - Use in fuel; consumer	Consumer	-	13	-	9a, 9b	ESVOC SpERC 9.12c.v1

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01 - Manufacture of the substance

Section 1	
Title	
01 - Manufacture of the substance	
Use descriptor	
Sector(s) of use	
Process categories	1, 2, 3, 4, 8a, 8b, 9, 15, 28
Environmental release categories	1
Specific category of environmental release	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as a process chemical or extraction agent. It includes recycling/recovery, material transfers, storage, maintenance and cargo (including seagoing vessels/barges, road/rail wagons and bulk containers), sampling and associated laboratory activities.	
Evaluation method	
See Section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Monitoring workers' exposure	
Product features	
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure with potential for aerosol generation
Concentration of substance in the product	It covers a percentage of substance in the product up to 100 %. (unless otherwise stated)
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless otherwise stated)
Other operating conditions that affect exposure	It assumes that a good basic standard of professional hygiene is implemented Covers use at room temperature. (unless otherwise stated)
Exposure scenarios	Specific risk management measures and operating conditions
General measures (skin irritants)	Make sure that direct contact with the skin is avoided. Identify potential areas for indirect contact with the skin. Wear suitable gloves tested according to EN374. Immediately collect spills. Immediately wash any area of the skin exposed to contamination. For further specifications, refer to section 8 of the SDS.
General measurements (flammability)	refer to section 2 of the SDS; For measures to control risks arising from physico-chemical properties, please refer to the main body of the SDS, sections 7 and/or 8.
General measures (aspiration hazard)	refer to section 2 of the SDS; Do not swallow. If ingested, seek immediate medical attention.
General measures applicable to all activities	Minimize exposure by using measures such as closed systems, properly designed and maintained dedicated structures, and adequate general/local exhaust ventilation. Unload and wash the system before using or maintaining the equipment. Ensure that staff are informed and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable overalls to prevent exposure to the skin. Wear suitable gloves tested according to EN374. Wear respiratory protection when its use is identified for certain Exposure Scenarios. Immediately collect spills. Dispose of this material and its container at the point of collection of hazardous or special waste. Ensure that control measures are regularly inspected and maintained. Consider the need for risk-based health surveillance.
CS1 General exposures; Closed systems (PROC_1)	Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes a process temperature of up to 800.0 °C
CS2 General exposures; Closed systems (PROC_2)	Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. Make sure that the operation is undertaken outdoors. Assumes a process temperature of up to 800.0 °C
CS3 General exposures; Closed systems (PROC_3)	Provide ventilation by extraction at the points where emissions occur. Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. Assumes a process temperature of up to 800.0 °C
CS4 General exposures; Open Systems (PROC_4)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.

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CS5 Process sampling (PROC_9)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS6 Laboratory activities (PROC_15)	No other specific measures have been identified. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Put the lids on the containers immediately after use.
CS7 Batch transfers; Closed systems (PROC_8b)	Handle the substance within a closed system. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS8 Batch transfers; Open Systems (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS9 Equipment cleaning and maintenance (PROC_8a, PROC_28)	Unload and wash the system before using or maintaining the equipment. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Wear suitable overalls to prevent exposure to the skin. Immediately collect spills.
CS10 Storage (PROC_2, PROC_1)	Store the substance in a closed system.

Section 2.2 Monitoring of environmental exposure

Product features

The substance is UVCB complex. Predominantly hydrophobic.

Quantities used

Fraction of EU tonnage used in the region	0,1
Tonnage for regional use (tonnes/year)	2.4E+07
Fraction of regional tonnage used locally	8.0E-01
Annual tonnage of the site (tons/year)	1.9E+07
Maximum daily amount of the site (kg/day)	6.3E+07

Frequency and duration of use

Continuous release.

Issue days (days/year)	300
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Environmental factors not affected by risk management

Local freshwater dilution factor	10
Local seawater dilution factor	100

Other operating conditions that affect environmental exposure

Release of the fraction into the air from the process (initial release before risk management measures)	1.0E-02
Release of the fraction to the wastewater from the process (initial release before risk management measures)	2.0E-07
Release of the fraction into the soil from the process (initial release before risk management measures)	0.0001

Technical conditions and measures at process level (source) to prevent release

Common practices vary between sites, so conservative estimates of the release of the process are used.

On-site technical conditions and measures to reduce or limit discharges, air emissions and emissions to soil

The risk from environmental exposure refers to freshwater sediments.

Prevent the discharge of undissolved substances or recover from wastewater on site.

In case of discharge into a domestic wastewater treatment plant, no on-site wastewater treatment is required

Treat air emissions to provide a typical removal efficiency of (%)	9.0E+01
Treat wastewater on site (before receiving water discharge) to provide the required removal efficiency > = (%)	93,7

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In case of discharge into the domestic wastewater treatment plant, provide the required on-site wastewater removal efficiency of > = (%)	0,0		
Organizational measures to prevent/limit the release from the site			
Do not release industrial sludge on natural soils. Sludge must be incinerated, contained or regenerated.			
Conditions and measures relating to the local waste water treatment plant			
Not applicable as there is no release to wastewater.			
Estimated removal of substances from wastewater through domestic wastewater treatment (%)	94,8		
Total efficiency of wastewater removal after on-site and off-site RMMs (domestic treatment plant) (%)	94,8		
Maximum permissible tonnage of the site (MSafe) based on release after total removal of wastewater treatment (kg/d)	7.4E+07		
Estimated flow rate of the domestic waste water treatment plant (m3/d)	1.0E+04		
Conditions and measures relating to the external treatment of waste destined for disposal			
No waste of the substance is generated during manufacture.			
Conditions and measures relating to the external recovery of waste			
No waste of the substance is generated during manufacture.			
Section 3 Exposure Estimation			
3.1. Health			
The ECETOC TRA tool has been used to estimate workplace exposures, unless otherwise stated.			
3.2. Environment			
The Hydrocarbon Block method was used to calculate environmental exposure with the PETRORISK model.			
Section 4 Guidelines to Verify Compliance with the Exposure Scenario			
4.1. Health			
The projected exposures are not expected to exceed DN(M)EL when the risk management measures/operating conditions set out in Section 2 are implemented.; Where other risk management measures/operating conditions are taken, users should ensure that risks are managed at at least equivalent levels.; The available hazard data do not allow the derivation of a DNEL for skin irritant effects.; The available hazard data do not support the need to establish a DNEL for other health effects; The available hazard data do not allow the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation.			
Workers CS 1: General exposures; Closed systems (PROC 1)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour >10. 000 Pa	0. 035 mg/m ³ (TRA Workers) RCR = 5. 07 E-4 Support exposure (not used for RC): 1 mg/m ³ (Measured data: Report concawe No 1/06)	RCR final < 0. 01
Inhalation, systemic, acute	Vapour >10. 000 Pa	0. 139 mg/m ³ (TRA Workers) RCR = 3. 23 E-5	RCR final < 0. 01
Combined exposure routes, systemic, lungo termine			RCR final < 0. 01
Combined exposure routes, systemic, acute			RCR final < 0. 01
Workers CS 2: General exposures; Closed systems (PROC 2)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour >10. 000 Pa	60. 66 mg/m ³ (TRA Workers) RCR = 0. 888 Support exposure (not used for RC): 1 mg/m ³ (Measured data: Report concawe No 1/06)	Final RCR = 0. 888
Inhalation, systemic, acute	Vapour >10. 000 Pa	242.6 mg/m ³ (TRA Workers) RCR = 0. 057	Final RCR = 0.057
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 888

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Combined exposure routes, systemic, acute			Final RCR = 0.057
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Workers CS 3: General exposures; Closed systems (PROC 3)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour >10.000 Pa	17.33 mg/m ³ (TRA Workers) RCR = 0.254	Final RCR = 0.254
Inhalation, systemic, acute	Vapour >10.000 Pa	69.32 mg/m ³ (TRA Workers) RCR = 0.016	Final RCR = 0.016
Combined exposure routes, systemic, lungo termine			Final RCR = 0.254
Combined exposure routes, systemic, acute			Final RCR = 0.016

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3.729 mg/m ³ (TRA Workers) RCR = 0.055	Final RCR = 0.204
	Vapour 10-500 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 6 mg/m ³ (Measured data: Report concawe No 1/06)	
	Vapour 500-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 0.028	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 5.07 E-4	
Inhalation, systemic, acute	Aerosol	14.92 mg/m ³ (TRA Workers) RCR = 3.48 E-3	Final RCR = 0.013
	Vapour 10-500 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	
	Vapour 500-10.000 Pa	7.69 mg/m ³ (TRA Workers) RCR = 1.79 E-3	
	Vapour >10.000 Pa	0.139 mg/m ³ (TRA Workers) RCR = 3.23 E-5	
Dermal, systemic, long-term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.675
Combined exposure routes, systemic, acute			Final RCR = 0.013

Workers CS 5: Process sampling (PROC 9)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3.729 mg/m ³ (TRA Workers) RCR = 0.055	Final RCR = 0.246
	Vapour 10-500 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 1.03 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 500-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	
	Vapour >10.000 Pa	0.069 mg/m ³ (TRA Workers) RCR = 1.01 E-3	
Inhalation, systemic, acute	Aerosol	14.92 mg/m ³ (TRA Workers) RCR = 3.48 E-3	Final RCR = 0.016

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Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3 Support exposure (not used for RC): 33 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10. 000 Pa	19. 22 mg/m ³ (TRA Workers) RCR = 4. 48 E-3	
	Vapour >10. 000 Pa	0. 277 mg/m ³ (TRA Workers) RCR = 6. 47 E-5	
Dermal, systemic, long-term	Dermal	1. 372 mg/kg bw/day (TRA Workers) RCR = 0. 472	Final RCR = 0. 472
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 718
Combined exposure routes, systemic, acute			Final RCR = 0. 016

Workers CS 6: Laboratory activities (PROC 15)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0. 373 mg/m ³ (TRA Workers) RCR = 5. 46 E-3s	Final RCR = 0. 14
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12 Support exposure (not used for RC): 7.9 mg/m ³ (Measured data: Concawe Report No 1/06) 9 mg/m ³ (Measured data: Report concawe No 1/06)	
	Vapour 50 0-10. 000 Pa	0. 961 mg/m ³ (TRA Workers) RCR = 0. 014	
	Vapour >10. 000 Pa	0. 017 mg/m ³ (TRA Workers) RCR = 2. 54 E-4	
Inhalation, systemic, acute	Aerosol	1. 492 mg/m ³ (TRA Workers) RCR = 3. 48 E-4	RCR final < 0. 01
	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3	
	Vapour 50 0-10. 000 Pa	3. 845 mg/m ³ (TRA Workers) RCR = 8. 97 E-4	
	Vapour >10. 000 Pa	0. 069 mg/m ³ (TRA Workers) RCR = 1. 62 E-5	
Dermal, systemic, long-term	Dermal	0. 34 mg/kg bw/day(TRA Workers) RCR = 0. 117	Final RCR = 0. 117
Dermal, local, long-term	Dermal	0. 099 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0. 099 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 257
Combined exposure routes, systemic, acute			RCR final < 0. 01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12 Support exposure (not used for RC): 0. 75 mg/m ³ (Measured data: Concawe Report No 1/06) 18 mg/m ³ (Measured data: Concawe Report No 1/06)	Final RCR = 0. 156

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	Vapour 50 0-10.000 Pa	2.403 mg/m ³ (TRA Workers) RCR = 0.035	
	Vapour >10.000 Pa	0.052 mg/m ³ (TRA Workers) RCR = 7.61 E-4	
Inhalation, systemic, acute	Vapour 1 0-500 Pa	32.88 mg/m ³ (TRA Workers)	RCR final < 0.01
		RCR = 7.67 E-3 Support exposure (not used for RC): 24 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	9.612 mg/m ³ (TRA Workers) RCR = 2.24 E-3	
	Vapour >10.000 Pa	0.208 mg/m ³ (TRA Workers) RCR = 4.85 E-5	
Dermal, systemic, long-term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.627
Combined exposure routes, systemic, acute			RCR final < 0.01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0.746 mg/m ³ (TRA Workers) RCR = 0.011	Final RCR = 0.167
	Vapour 1 0-500 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 2.63 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	2.403 mg/m ³ (TRA Workers) RCR = 0.035	
	Vapour >10.000 Pa	0.052 mg/m ³ (TRA Workers) RCR = 7.61 E-4	
Inhalation, systemic, acute	Aerosol	2.983 mg/m ³ (TRA Workers) RCR = 6.96 E-4	Final RCR = 0.111
	Vapour 1 0-500 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3 Support exposure (not used for RC): 84 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	9.612 mg/m ³ (TRA Workers) RCR = 2.24 E-3	
	Vapour >10.000 Pa	0.208 mg/m ³ (TRA Workers) RCR = 4.85 E-5	
Dermal, systemic, long-term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.638

Workers CS 9: Cleaning and maintenance of equipment (PROC 8a, PROC 28)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
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Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	16. 44 mg/m ³ (TRA Workers) RCR = 0. 241 Support exposure (not used for RC): 1. 25 mg/m ³ (Measured data: Concawe Report No. 1/06)	Final RCR = 0. 312
	Vapour 50 0-10. 000 Pa	4. 806 mg/m ³ (TRA Workers) RCR = 0. 07	
	Vapour >10. 000 Pa	0. 087 mg/m ³ (TRA Workers) RCR = 1. 27 E-3s	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	65. 77 mg/m ³ (TRA Workers) RCR = 0. 015 Support exposure (not used for RC): 40 mg/m ³ (Measured data: Concawe Report No. 1/06)	Final RCR = 0. 02
	Vapour 50 0-10. 000 Pa	19. 22 mg/m ³ (TRA Workers) RCR = 4. 48 E-3	
	Vapour >10. 000 Pa	0. 347 mg/m ³ (TRA Workers) RCR = 8. 08 E-5	
Dermal, systemic, long-term	Dermal	1. 371 mg/kg bw/day (TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 783
Combined exposure routes, systemic, acute			Final RCR = 0. 02

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	1. 644 mg/m ³ (TRA Workers) RCR = 0. 024	Final RCR = 0. 031
	Vapour 50 0-10. 000 Pa	0. 481 mg/m ³ (TRA Workers) RCR = 7. 03 E-3	
	Vapour >10. 000 Pa	8. 67 E-3 mg/m ³ (TRA Workers) RCR = 1. 27 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6. 577 mg/m ³ (TRA Workers) RCR = 1. 53 E-3	RCR final < 0. 01
	Vapour 50 0-10. 000 Pa	1. 922 mg/m ³ (TRA Workers) RCR = 4. 48 E-4	
	Vapour >10. 000 Pa	0. 035 mg/m ³ (TRA Workers) RCR = 8. 08 E-6	
Dermal, systemic, long-term	Dermal	1. 37 mg/kg bw/day(TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 502
Combined exposure routes, systemic, acute			RCR final < 0. 01

4.2. Environment

The guidelines are based on presumed operating conditions that may not apply to all sites; therefore, it may be necessary to scale to define appropriate site-specific risk management measures. The required removal efficiency for wastewater can be achieved using on-site/off-site technologies, alone or in combination. The required removal efficiency for air can be achieved using technologies on site, alone or in combination. Further details on scaling and control technologies are provided in the SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Maximum risk characterisation ratio for RCRair air emissions	7.1E-01
Maximum risk characterisation ratio for RCRwater wastewater emissions	8.3E-01

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02 - Formulation and (re)packaging of substances and mixtures

Section 1	
Title	
02 - Formulation and (re)packaging of substances and mixtures	
Use descriptor	
Sector(s) of use	
Process categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 28
Environmental release categories	2
Specific category of environmental release	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	
Formulation, packaging and repackaging of the substance and its mixtures in batch or continuous operations, including storage, material transfer, mixing, compressing, compression, pelletisation, extrusion, large and small-scale packaging, sampling, maintenance and associated laboratory activities.	
Evaluation method	
See Section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Monitoring workers' exposure	
Product features	
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure with potential for aerosol generation
Concentration of substance in the product	It covers a percentage of substance in the product up to 100 %. (unless otherwise stated)
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless otherwise stated)
Other operating conditions that affect exposure	It assumes that a good basic standard of professional hygiene is implemented 303]Covers use at room temperature. (unless otherwise stated)
Exposure scenarios	Specific risk management measures and operating conditions
General measures (skin irritants)	Make sure that direct contact with the skin is avoided. Identify potential areas for indirect contact with the skin. Wear suitable gloves tested according to EN374. Immediately collect spills. Immediately wash any area of the skin exposed to contamination. For further specifications, refer to section 8 of the SDS.
General measurements (flammability)	refer to section 2 of the SDS; For measures to control risks arising from physico-chemical properties, please refer to the main body of the SDS, sections 7 and/or 8.
General measures (aspiration hazard)	refer to section 2 of the SDS; Do not swallow. If ingested, seek immediate medical attention.
General measures applicable to all activities	Minimize exposure by using measures such as closed systems, properly designed and maintained dedicated structures, and adequate general/local exhaust ventilation. Unload and wash the system before using or maintaining the equipment. Ensure that staff are informed and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable overalls to prevent exposure to the skin. Wear suitable gloves tested according to EN374. Wear respiratory protection when its use is identified for certain Exposure Scenarios. Immediately collect spills. Dispose of this material and its container at the point of collection of hazardous or special waste. Ensure that control measures are regularly inspected and maintained. Consider the need for risk-based health surveillance.
CS1 General exposures; Closed systems (PROC_2, PROC_1, PROC_3)	Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. 361]
CS2 General exposures; Open Systems (PROC_4)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS3 Batch process; High temperature; Use in closed systems (PROC_3)	Provide ventilation by extraction at the points where emissions occur. Handle the substance within a closed system. Covers process temperatures up to 60.0°C
CS4 Process sampling (PROC_9)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.

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CS5 Laboratory activities (PROC_15)	No other specific measures have been identified. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Put the lids on the containers immediately after use.
CS6 Batch transfers; Dedicated structure (PROC_8b)	Handle the substance within a closed system. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS7 Mixing operations; Open Systems (PROC_5)	Provide ventilation by extraction at the points where emissions occur. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS8 Manual; Transfer from/pouring from containers; Non-dedicated structure (PROC_8a)	Use drum pumps. 411] Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS9 Transfers of drums/lots; Dedicated structure (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS10 Scaffolding, compression, extrusion or pelletizing (PROC_14)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS11 Filling of drums and small containers (PROC_9)	Wear suitable gloves tested according to EN374. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS.
CS12 Equipment cleaning and maintenance (PROC_8a, PROC_28)	Unload and wash the system before using or maintaining the equipment. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Wear suitable overalls to prevent exposure to the skin. 468] Immediately collect spills.
CS13 Storage (PROC_2, PROC_1)	Store the substance in a closed system.

Section 2.2 Monitoring of environmental exposure

Product features

The substance is UVCB complex. Predominantly hydrophobic.

Quantities used

Fraction of EU tonnage used in the region	0,1
Tonnage for regional use (tonnes/year)	2.7E+07
Fraction of regional tonnage used locally	1.1E-03
Annual tonnage of the site (tons/year)	3.0E+04
Maximum daily amount of the site (kg/day)	1.0E+05

Frequency and duration of use

Continuous release.	
Issue days (days/year)	300

Environmental factors not affected by risk management

Local freshwater dilution factor	10
Local seawater dilution factor	100

Other operating conditions that affect environmental exposure

Release of the fraction into the air from the process (after typical on-site RMMs, in line with the requirements of the EU Solvent Emissions Directive)	1.0E-02
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Release of the fraction to the wastewater from the process (initial release before risk management measures)	2.0E-05		
Release of the fraction into the soil from the process (initial release before risk management measures)	0.0001		
Technical conditions and measures at process level (source) to prevent release			
Common practices vary between sites, so conservative estimates of the release of the process are used.			
On-site technical conditions and measures to reduce or limit discharges, air emissions and emissions to soil			
The risk from environmental exposure refers to freshwater sediments.			
Prevent the discharge of undissolved substances or recover from wastewater on site.			
In case of discharge into a domestic wastewater treatment plant, no on-site wastewater treatment is required			
Treat air emissions to provide a typical removal efficiency of (%)	0.0E+00		
Treat wastewater on site (before receiving water discharge) to provide the required removal efficiency > = (%)	92,1		
In case of discharge into the domestic wastewater treatment plant, provide the required on-site wastewater removal efficiency of > = (%)	0,0		
Organizational measures to prevent/limit the release from the site			
Do not release industrial sludge on natural soils. Sludge must be incinerated, contained or regenerated.			
Conditions and measures relating to the local waste water treatment plant			
Not applicable as there is no release to wastewater.			
Estimated removal of substances from wastewater through domestic wastewater treatment (%)	94,8		
Total efficiency of wastewater removal after on-site and off-site RMMs (domestic treatment plant) (%)	94,8		
Maximum permissible tonnage of the site (MSafe) based on release after total removal of wastewater treatment (kg/d)	1.5E+05		
Estimated flow rate of the domestic waste water treatment plant (m3/d)	2.0E+03		
Conditions and measures relating to the external treatment of waste destined for disposal			
The external treatment and disposal of waste must comply with applicable local and/or national regulations.			
Conditions and measures relating to the external recovery of waste			
The external recovery and recycling of waste must comply with applicable local and/or national regulations.			
Section 3 Exposure Estimation			
3.1. Health			
The ECETOC TRA tool has been used to estimate workplace exposures, unless otherwise stated.			
3.2. Environment			
The Hydrocarbon Block method was used to calculate environmental exposure with the PETRORISK model.			
Section 4 Guidelines to Verify Compliance with the Exposure Scenario			
4.1. Health			
The projected exposures are not expected to exceed DN(M)EL when the risk management measures/operating conditions set out in Section 2 are implemented.; Where other risk management measures/operating conditions are taken, users should ensure that risks are managed at at least equivalent levels.; The available hazard data do not allow the derivation of a DNEL for skin irritant effects.; The available hazard data do not support the need to establish a DNEL for other health effects; The available hazard data do not allow the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation.			
Workers CS 1: General exposures; Closed systems (PROC 2, PROC1; PROC 3)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	1. 644 mg/m ³ (TRA Workers) RCR = 0. 024 Support exposure (not used for RC): 1 mg/m ³ (Measured data: Report concawe No 1/06)	Final RCR = 0. 031
	Vapour 50 0-10. 000 Pa	0. 481 mg/m ³ (TRA Workers) RCR = 7. 03 E-3	
	Vapour >10. 000 Pa	8. 67 E-3 mg/m ³ (TRA Workers) RCR = 1. 27 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6. 577 mg/m ³ (TRA Workers) RCR = 1. 53 E-3	RCR final < 0. 01

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	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long-term	Dermal	1.37 mg/kg bw/day(TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.502
Combined exposure routes, systemic, acute			RCR final < 0.01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3.729 mg/m ³ (TRA Workers) RCR = 0.055	Final RCR = 0.204
	Vapour 1 0-5 00 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 6 mg/m ³ (Measured data: Report concawe No 1/06)	
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 0.028	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 5.07 E-4	
Inhalation, systemic, acute	Aerosol	14.92 mg/m ³ (TRA Workers) RCR = 3.48 E-3	Final RCR = 0.013
	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	
	Vapour 50 0-10.000 Pa	7.69 mg/m ³ (TRA Workers) RCR = 1.79 E-3	
	Vapour >10.000 Pa	0.139 mg/m ³ (TRA Workers) RCR = 3.23 E-5	
Dermal, systemic, long-term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.675
Combined exposure routes, systemic, acute			Final RCR = 0.013

Workers CS 3: Batch processes; High temperature; Use in contained systems(PROC 3)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	0.876 mg/m ³ (TRA Workers) RCR = 0.013	Final RCR = 0.022
	Vapour 50 0-10.000 Pa	0.606 mg/m ³ (TRA Workers) RCR = 8.87 E-3	
	Vapour >10.000 Pa	0.029 mg/m ³ (TRA Workers) RCR = 4.31 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	3.503 mg/m ³ (TRA Workers) RCR = 8.17 E-4	RCR final < 0.01
	Vapour 50 0-10.000 Pa	2.426 mg/m ³ (TRA Workers) RCR = 5.66 E-4	

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	Vapour >10.000 Pa	0. 118 mg/m ³ (TRA Workers) RCR = 2. 75 E-5	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 022
Combined exposure routes, systemic, acute			RCR final < 0. 01

Workers CS 4: Process sampling (PROC 9)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3. 729 mg/m ³ (TRA Workers) RCR = 0. 055	Final RCR = 0. 246
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12 Support exposure (not used for RC): 1. 03 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10. 000 Pa	4. 806 mg/m ³ (TRA Workers) RCR = 0. 07	
	Vapour >10. 000 Pa	0. 069 mg/m ³ (TRA Workers) RCR = 1. 01 E-3	
Inhalation, systemic, acute	Aerosol	14. 92 mg/m ³ (TRA Workers) RCR = 3. 48 E-3	Final RCR = 0. 016
	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3 Support exposure (not used for RC): 33 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10. 000 Pa	19. 22 mg/m ³ (TRA Workers) RCR = 4. 48 E-3	
	Vapour >10. 000 Pa	0. 277 mg/m ³ (TRA Workers) RCR = 6. 47 E-5	
Dermal, systemic, long-term	Dermal	1. 372 mg/kg bw/day (TRA Workers) RCR = 0. 472	Final RCR = 0. 472
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 718
Combined exposure routes, systemic, acute			Final RCR = 0. 016

Workers CS 5: Laboratory activities (PROC 15)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0. 373 mg/m ³ (TRA Workers) RCR = 5. 46 E-3s	Final RCR = 0. 14
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12 Support exposure (not used for RC): 7.9 mg/m ³ (Measured data: Concawe Report No 1/06) 9 mg/m ³ (Measured data: Report concawe No 1/06)	
	Vapour 50 0-10. 000 Pa	0. 961 mg/m ³ (TRA Workers) RCR = 0. 014	
	Vapour >10. 000 Pa	0. 017 mg/m ³ (TRA Workers) RCR = 2. 54 E-4	
Inhalation, systemic, acute	Aerosol	1. 492 mg/m ³ (TRA Workers) RCR = 3. 48 E-4	RCR final < 0. 01
	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3	

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	Vapour 50 0-10.000 Pa	3.845 mg/m ³ (TRA Workers) RCR = 8.97 E-4	
	Vapour >10.000 Pa	0.069 mg/m ³ (TRA Workers) RCR = 1.62 E-5	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Dermal, local, long-term	Dermal	0.099 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.099 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.257
Combined exposure routes, systemic, acute			RCR final < 0.01

Workers CS 6: Bulk transfers; Dedicated structure (PROC 8b)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-500 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 0.75 mg/m ³ (Measured data: Concawe Report No 1/06) 18 mg/m ³ (Measured data: Concawe Report No 1/06)	Final RCR = 0.156
	Vapour 50 0-10.000 Pa	2.403 mg/m ³ (TRA Workers) RCR = 0.035	
	Vapour >10.000 Pa	0.052 mg/m ³ (TRA Workers) RCR = 7.61 E-4	
Inhalation, systemic, acute	Vapour 1 0-500 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3 Support exposure (not used for RC): 24 mg/m ³ (Measured data: Concawe Report No 1/06)	RCR final < 0.01
	Vapour 50 0-10.000 Pa	9.612 mg/m ³ (TRA Workers) RCR = 2.24 E-3	
	Vapour >10.000 Pa	0.208 mg/m ³ (TRA Workers) RCR = 4.85 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.627
Combined routes of exposure, systemic, acute			RCR final < 0.01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0.373 mg/m ³ (TRA Workers) RCR = 5.46 E-3s	Final RCR = 0.025
	Vapour 1 0-500 Pa	0.822 mg/m ³ (TRA Workers) RCR = 0.012	
	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Aerosol	1.492 mg/m ³ (TRA Workers) RCR = 3.48 E-4	

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	Vapour 1 0-5 00 Pa	3. 288 mg/m ³ (TRA Workers) RCR = 7. 67 E-4	RCR final < 0. 01
	Vapour 50 0-10. 000 Pa	1. 922 mg/m ³ (TRA Workers) RCR = 4. 48 E-4	
	Vapour >10. 000 Pa	0. 035 mg/m ³ (TRA Workers) RCR = 8. 08 E-6	
Dermal, systemic, long term	Dermal	1. 371 mg/kg bw/day(TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 496
Combined exposure routes, systemic, acute			RCR final < 0. 01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, ,long term	Aerosol	0. 373 mg/m ³ (TRA Workers) RCR = 5. 46 E-3s	Final RCR = 0. 037
	Vapour 1 0-5 00 Pa	1. 644 mg/m ³ (TRA Workers) RCR = 0. 024	
	Vapour 50 0-10. 000 Pa	0. 481 mg/m ³ (TRA Workers) RCR = 7. 03 E-3	
	Vapour >10. 000 Pa	8. 67 E-3 mg/m ³ (TRA Workers) RCR = 1. 27 E-4	
Inhalation, systemic, acute	Aerosol	1. 492 mg/m ³ (TRA Workers) RCR = 3. 48 E-4	RCR final < 0. 01
	Vapour 1 0-5 00 Pa	6. 577 mg/m ³ (TRA Workers) RCR = 1. 53 E-3	
	Vapour 50 0-10. 000 Pa	1. 922 mg/m ³ (TRA Workers) RCR = 4. 48 E-4	
	Vapour >10. 000 Pa	0. 035 mg/m ³ (TRA Workers) RCR = 8. 08 E-6	
Dermal, systemic, long term	Dermal	1. 371 mg/kg bw/day (TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local,	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0. 508
Combined routes of exposure, systemic, acute			RCR final < 0. 01

Workers CS 9: Transfers of drums/lots; Dedicated structure (PROC 8b)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	0. 746 mg/m ³ (TRA Workers) RCR = 0. 011	Final RCR = 0. 167
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12	
	Vapour 50 0-10. 000 Pa	2. 403 mg/m ³ (TRA Workers) RCR = 0. 035	

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	Vapour >10.000 Pa	0.052 mg/m ³ (TRA Workers) RCR = 7.61 E-4	
Inhalation, systemic, acute	Aerosol	2.983 mg/m ³ (TRA Workers) RCR = 6.96 E-4	Final RCR = 0.011
	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	
	Vapour 50 0-10.000 Pa	9.612 mg/m ³ (TRA Workers) RCR = 2.24 E-3	
	Vapour >10.000 Pa	0.208 mg/m ³ (TRA Workers) RCR = 4.85 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.638
Combined routes of exposure, systemic, acute			Final RCR = 0.011

Workers CS 10: Compaction, compression, extrusion or pelletizing (PROC 14)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12	Final RCR = 0.192
	Vapour 50 0-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	
	Vapour >10.000 Pa	0.087 mg/m ³ (TRA Workers) RCR = 1.27 E-3s	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	Final RCR = 0.012
	Vapour 50 0-10.000 Pa	19.22 mg/m ³ (TRA Workers) RCR = 4.48 E-3	
	Vapour >10.000 Pa	0.347 mg/m ³ (TRA Workers) RCR = 8.08 E-5	
Dermal, systemic, long term	Dermal	0.686 mg/kg bw/day (TRA Workers) RCR = 0.236	Final RCR = 0.236
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.428
Combined routes of exposure, systemic, acute			Final RCR = 0.012

Workers CS 11: Filling of drums or small containers (PROC 9)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Aerosol	3.729 mg/m ³ (TRA Workers) RCR = 0.055	Final RCR = 0.246
	Vapour 1 0-5 00 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12	
	Vapour 50 0-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	

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	Vapour >10.000 Pa	0.069 mg/m ³ (TRA Workers) RCR = 1.01 E-3	
Inhalation, systemic, acute	Aerosol	14.92 mg/m ³ (TRA Workers) RCR = 3.48 E-3	Final RCR = 0.016
	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	
	Vapour 50 0-10.000 Pa	19.22 mg/m ³ (TRA Workers) RCR = 4.48 E-3	
	Vapour >10.000 Pa	0.277 mg/m ³ (TRA Workers) RCR = 6.47 E-5	
Dermal, systemic, long term	Dermal	1.372 mg/kg bw/day (TRA Workers) RCR = 0.472	Final RCR = 0.472
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.718
Combined routes of exposure, systemic, acute			Final RCR = 0.016

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	16.44 mg/m ³ (TRA Workers) RCR = 0.241 Support exposure (not used for RC): 1.25 mg/m ³ (Measured data: Concawe Report No. 1/06)	Final RCR = 0.312
	Vapour 50 0-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	
	Vapour >10.000 Pa	0.087 mg/m ³ (TRA Workers) RCR = 1.27 E-3s	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	65.77 mg/m ³ (TRA Workers) RCR = 0.015 Support exposure (not used for RC): 40 mg/m ³ (Measured data: Concawe Report No. 1/06)	Final RCR = 0.02
	Vapour 50 0-10.000 Pa	19.22 mg/m ³ (TRA Workers) RCR = 4.48 E-3	
	Vapour >10.000 Pa	0.347 mg/m ³ (TRA Workers) RCR = 8.08 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.783
Combined routes of exposure, systemic, acute			Final RCR = 0.02

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	1.644 mg/m ³ (TRA Workers) RCR = 0.024	Final RCR = 0.031

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	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Vapour 1 0-500 Pa	6.577 mg/m ³ (TRA Workers) RCR = 1.53 E-3	RCR final < 0.01
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day(TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.502
Combined routes of exposure, systemic, acute			RCR final < 0.01

4.2. Environment

The guidelines are based on presumed operating conditions that may not apply to all sites; therefore, it may be necessary to scale to define appropriate site-specific risk management measures. The required removal efficiency for wastewater can be achieved using on-site/off-site technologies, alone or in combination. The required removal efficiency for air can be achieved using technologies on site, alone or in combination. Further details on scaling and control technologies are provided in the SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Maximum risk characterisation ratio for RCRair air emissions	1.1E-02
Maximum risk characterisation ratio for RCRwater wastewater emissions	6.6E-01

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12a - Use in fuels; Industrial

Section 1	
Title	
12a - Use in fuels; Industrial	
Use descriptor	
Sector(s) of use	
Process categories	1, 2, 8a, 8b, 16, 28
Environmental release categories	7
Specific category of environmental release	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	
It covers use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and waste management.	
Evaluation method	
See Section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Monitoring workers' exposure	
Product features	
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure with potential for aerosol generation
Concentration of substance in the product	It covers a percentage of substance in the product up to 100 %. (unless otherwise stated)
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless otherwise stated)
Other operating conditions that affect exposure	It assumes that a good basic standard of professional hygiene is implemented 303]Covers use at room temperature. (unless otherwise stated)
Exposure scenarios	Specific risk management measures and operating conditions
General measures (skin irritants)	Make sure that direct contact with the skin is avoided. Identify potential areas for indirect contact with the skin. Wear suitable gloves tested according to EN374. Immediately collect spills. Immediately wash any area of the skin exposed to contamination. For further specifications, refer to section 8 of the SDS.
General measurements (flammability)	refer to section 2 of the SDS; For measures to control risks arising from physico-chemical properties, please refer to the main body of the SDS, sections 7 and/or 8.
General measures (aspiration hazard)	refer to section 2 of the SDS; Do not swallow. If ingested, seek immediate medical attention.
General measures applicable to all activities	Minimize exposure by using measures such as closed systems, properly designed and maintained dedicated structures, and adequate general/local exhaust ventilation. Unload and wash the system before using or maintaining the equipment. Ensure that staff are informed and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable overalls to prevent exposure to the skin. Wear suitable gloves tested according to EN374. Wear respiratory protection when its use is identified for certain Exposure Scenarios. Immediately collect spills. Dispose of this material and its container at the point of collection of hazardous or special waste. Ensure that control measures are regularly inspected and maintained. Consider the need for risk-based health surveillance.
CS1 Batch transfers; Dedicated structure (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS2 Transfers of drums/lots; Dedicated structure (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS3 General exposures; Closed systems (PROC_2, PROC_1)	Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. 361]

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CS4 Use of fuels; Closed systems (PROC_16)	Handle the substance within a closed system. 405]
CS5 Equipment cleaning and maintenance (PROC_8a, PROC_28)	Unload and wash the system before using or maintaining the equipment. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Wear suitable overalls to prevent exposure to the skin. 468] Immediately collect spills.
CS6 Storage (PROC_2, PROC_1)	Store the substance in a closed system.
Section 2.2 Monitoring of environmental exposure	
Product features	
The substance is UVCB complex. Predominantly hydrophobic.	
Quantities used	
Fraction of EU tonnage used in the region	0,1
Tonnage for regional use (tonnes/year)	3.4E+06
Fraction of regional tonnage used locally	4.4E-01
Annual tonnage of the site (tons/year)	1.5E+06
Maximum daily amount of the site (kg/day)	5.0E+06
Frequency and duration of use	
Continuous release.	
Issue days (days/year)	300
Environmental factors not affected by risk management	
Local freshwater dilution factor	10
Local seawater dilution factor	100
Other operating conditions that affect environmental exposure	
Release of the fraction into the air from the process (initial release before risk management measures)	5.0E-03
Release of the fraction to the wastewater from the process (initial release before risk management measures)	5.5E-07
Release of the fraction into the soil from the process (initial release before risk management measures)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary between sites, so conservative estimates of the release of the process are used.	
On-site technical conditions and measures to reduce or limit discharges, air emissions and emissions to soil	
The risk from environmental exposure refers to freshwater sediments.	
In case of discharge into a domestic wastewater treatment plant, no on-site wastewater treatment is required	
Treat air emissions to provide a typical removal efficiency of (%)	9.5E+01
Treat wastewater on site (before receiving water discharge) to provide the required removal efficiency > = (%)	94,2
In case of discharge into the domestic wastewater treatment plant, provide the required on-site wastewater removal efficiency of > = (%)	0,0
Organizational measures to prevent/limit the release from the site	
Do not release industrial sludge on natural soils. Sludge must be incinerated, contained or regenerated.	
Conditions and measures relating to the local waste water treatment plant	
Not applicable as there is no release to wastewater.	
Estimated removal of substances from wastewater through domestic wastewater treatment (%)	94,8
Total efficiency of wastewater removal after on-site and off-site RMMs (domestic treatment plant) (%)	94,8
Maximum permissible tonnage of the site (MSafe) based on release after total removal of wastewater treatment (kg/d)	5.5E+06
Estimated flow rate of the domestic waste water treatment plant (m3/d)	2.0E+03
Conditions and measures relating to the external treatment of waste destined for disposal	
Combustion emissions limited by the necessary exhaust emission controls. Combustion emissions considered in the regional exposure assessment. The external treatment and disposal of waste must comply with applicable local and/or national regulations.	
Conditions and measures relating to the external recovery of waste	
This substance is consumed during use and no rejection of the substance is generated.	
Section 3 Exposure Estimation	

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3.1. Health			
The ECETOC TRA tool has been used to estimate workplace exposures, unless otherwise stated.			
3.2. Environment			
The Hydrocarbon Block method was used to calculate environmental exposure with the PETRORISK model.			
Section 4 Guidelines to Verify Compliance with the Exposure Scenario			
4.1. Health			
The projected exposures are not expected to exceed DN(M)EL when the risk management measures/operating conditions set out in Section 2 are implemented.; Where other risk management measures/operating conditions are taken, users should ensure that risks are managed at at least equivalent levels.; The available hazard data do not allow the derivation of a DNEL for skin irritant effects.; The available hazard data do not support the need to establish a DNEL for other health effects; The available hazard data do not allow the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation.			
Workers CS 1: Bulk transfers; Dedicated structure (PROC 8b)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0. 746 mg/m ³ (TRA Workers) RCR = 0. 011	Final RCR = 0. 167
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12	
	Vapour 50 0-10. 000 Pa	2. 403 mg/m ³ (TRA Workers) RCR = 0. 035	
	Vapour >10. 000 Pa	0. 052 mg/m ³ (TRA Workers) RCR = 7. 61 E-4	
Inhalation, systemic, acute	Aerosol	2. 983 mg/m ³ (TRA Workers) RCR = 6. 96 E-4	Final RCR = 0. 011
	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3	
	Vapour 50 0-10. 000 Pa	9. 612 mg/m ³ (TRA Workers) RCR = 2. 24 E-3	
	Vapour >10. 000 Pa	0. 208 mg/m ³ (TRA Workers) RCR = 4. 85 E-5	
Dermal, systemic, long-term	Dermal	1. 371 mg/kg bw/day (TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 638
Combined exposure routes, systemic, acute			Final RCR = 0. 011
Workers CS 2: Transfers of drums/lots; Dedicated structure (PROC 8b)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0. 746 mg/m ³ (TRA Workers) RCR = 0. 011	Final RCR = 0. 167
	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12	
	Vapour 50 0-10. 000 Pa	2. 403 mg/m ³ (TRA Workers) RCR = 0. 035	
	Vapour >10. 000 Pa	0. 052 mg/m ³ (TRA Workers) RCR = 7. 61 E-4	
Inhalation, systemic, acute	Aerosol	2. 983 mg/m ³ (TRA Workers) RCR = 6. 96 E-4	Final RCR = 0. 011
	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3	
	Vapour 50 0-10. 000 Pa	9. 612 mg/m ³ (TRA Workers) RCR = 2. 24 E-3	

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	Vapour >10.000 Pa	0.208 mg/m ³ (TRA Workers) RCR = 4.85 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.638
Combined routes of exposure, systemic, acute			Final RCR = 0.011

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	1.644 mg/m ³ (TRA Workers) RCR = 0.024	Final RCR = 0.031
	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6.577 mg/m ³ (TRA Workers) RCR = 1.53 E-3	RCR final < 0.01
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day(TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.502
Combined routes of exposure, systemic, acute			RCR final < 0.01

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	1.644 mg/m ³ (TRA Workers) RCR = 0.024	Final RCR = 0.031
	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6.577 mg/m ³ (TRA Workers) RCR = 1.53 E-3	RCR final < 0.01
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day(TRA Workers) RCR = 0.117	Final RCR = 0.117

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Dermal, local, long	Dermal	0.099 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.099 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.148
Combined routes of exposure, systemic, acute			RCR final < 0.01

Workers CS 5: Cleaning and maintenance of equipment(PROC 8a, PROC 28)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	16.44 mg/m ³ (TRA Workers) RCR = 0.241	Final RCR = 0.312
	Vapour 50 0-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	
	Vapour >10.000 Pa	0.087 mg/m ³ (TRA Workers) RCR = 1.27 E-3s	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	65.77 mg/m ³ (TRA Workers) RCR = 0.015	Final RCR = 0.02
	Vapour 50 0-10.000 Pa	19.22 mg/m ³ (TRA Workers) RCR = 4.48 E-3	
	Vapour >10.000 Pa	0.347 mg/m ³ (TRA Workers) RCR = 8.08 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.783
Combined routes of exposure, systemic, acute			Final RCR = 0.02

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	1.644 mg/m ³ (TRA Workers) RCR = 0.024	Final RCR = 0.031
	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6.577 mg/m ³ (TRA Workers) RCR = 1.53 E-3	RCR final < 0.01
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day(TRA Workers) RCR = 0.471	Final RCR = 0.471

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Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0. 502
Combined routes of exposure, systemic, acute			RCR final < 0. 01

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4.2. Environment

The guidelines are based on presumed operating conditions that may not apply to all sites; therefore, it may be necessary to scale to define appropriate site-specific risk management measures. The required removal efficiency for wastewater can be achieved using on-site/off-site technologies, alone or in combination. The required removal efficiency for air can be achieved using technologies on site, alone or in combination. Further details on scaling and control technologies are provided in the SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Maximum risk characterisation ratio for RCRair air emissions	1.4E-02
Maximum risk characterisation ratio for RCRwater wastewater emissions	9.0E-01

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12b - Use in fuels; Professional

Section 1	
Title	
12b - Use in fuels; Professional	
Use descriptor	
Sector(s) of use	
Process categories	1, 2, 8a, 8b, 16, 28
Environmental release categories	9a, 9b
Specific category of environmental release	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	
It covers use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and waste management.	
Evaluation method	
See Section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Monitoring workers' exposure	
Product features	
Physical form of the product	Liquid
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at standard temperature and pressure with potential for aerosol generation
Concentration of substance in the product	It covers a percentage of substance in the product up to 100 %. (unless otherwise stated)
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless otherwise stated)
Other operating conditions that affect exposure	It assumes that a good basic standard of professional hygiene is implemented 303]Covers use at room temperature. (unless otherwise stated)
Exposure scenarios	Specific risk management measures and operating conditions
General measures (skin irritants)	Make sure that direct contact with the skin is avoided. Identify potential areas for indirect contact with the skin. Wear suitable gloves tested according to EN374. Immediately collect spills. Immediately wash any area of the skin exposed to contamination. For further specifications, refer to section 8 of the SDS.
General measurements (flammability)	refer to section 2 of the SDS; For measures to control risks arising from physico-chemical properties, please refer to the main body of the SDS, sections 7 and/or 8.
General measures (aspiration hazard)	refer to section 2 of the SDS; Do not swallow. If ingested, seek immediate medical attention.
General measures applicable to all activities	Minimize exposure by using measures such as closed systems, properly designed and maintained dedicated structures, and adequate general/local exhaust ventilation. Unload and wash the system before using or maintaining the equipment. Ensure that staff are informed and trained on the nature of exposure and basic actions to minimise exposure. Wear suitable overalls to prevent exposure to the skin. Wear suitable gloves tested according to EN374. Wear respiratory protection when its use is identified for certain Exposure Scenarios. Immediately collect spills. Dispose of this material and its container at the point of collection of hazardous or special waste. Ensure that control measures are regularly inspected and maintained. Consider the need for risk-based health surveillance.
CS1 Batch transfers; Dedicated structure (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS2 Transfers of drums/lots; Dedicated structure (PROC_8b)	Use drum pumps. 411] Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS3 Replenishment (PROC_8b)	Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those

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	described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Make sure that no splashes occur during the transfer.
CS4 General exposures; Closed systems (PROC_2, PROC_1)	Handle the substance within a closed system. Sample via a closed loop or other system to avoid exposure. 361]
CS5 Use of fuels; Closed systems (PROC_16)	Handle the substance within a closed system. 405]
CS6 Equipment cleaning and maintenance (PROC_8a, PROC_28)	Unload and wash the system before using or maintaining the equipment. Wear chemical-resistant gloves (tested according to EN374) in combination with "basic" employee training. If skin contamination is expected to extend to other parts of the body, these parts of the body should also be protected with waterproof clothing equivalent to those described for the hands. For further specifications, refer to section 8 of the SDS. More advice on good practices. The obligations laid down in Article 37(4) of the REACH Regulation does not apply. Wear suitable overalls to prevent exposure to the skin. 468] Immediately collect spills.
CS7 Storage (PROC_2, PROC_1)	Store the substance in a closed system.
Section 2.2 Monitoring of environmental exposure	
Product features	
The substance is UVCB complex. Predominantly hydrophobic.	
Quantities used	
Fraction of EU tonnage used in the region	0,1
Tonnage for regional use (tonnes/year)	5.3E+06
Fraction of regional tonnage used locally	5.0E-04
Annual tonnage of the site (tons/year)	2.7E+03
Maximum daily amount of the site (kg/day)	7.3E+03
Frequency and duration of use	
Continuous release.	
Issue days (days/year)	365
Environmental factors not affected by risk management	
Local freshwater dilution factor	10
Local seawater dilution factor	100
Other operating conditions that affect environmental exposure	
Release of the fraction into the air from wide dispersive use (for regional use only)	5.0E-03
Release of the fraction into wastewater from extensive dispersive use	1.0E-06
Release fraction into soil from wide dispersive use (for regional use only)	0.00025
Technical conditions and measures at process level (source) to prevent release	
Common practices vary between sites, so conservative estimates of the release of the process are used.	
On-site technical conditions and measures to reduce or limit discharges, air emissions and emissions to soil	
The risk from environmental exposure refers to fresh water. [TCR1a]	
No wastewater treatment required [TCR6]	
Treat air emissions to provide a typical removal efficiency of (%)	N/A
Treat wastewater on site (before receiving water discharge) to provide the required removal efficiency > = (%)	0,0
In case of discharge into the domestic wastewater treatment plant, provide the required on-site wastewater removal efficiency of > = (%)	0,0
Organizational measures to prevent/limit the release from the site	
Do not release industrial sludge on natural soils. Sludge must be incinerated, contained or regenerated.	
Conditions and measures relating to the local waste water treatment plant	
Not applicable as there is no release to wastewater.	
Estimated removal of substances from wastewater through domestic wastewater treatment (%)	94,8
Total efficiency of wastewater removal after on-site and off-site RMMs (domestic treatment plant) (%)	94,8
Maximum permissible tonnage of the site (MSafe) based on release after total removal of wastewater treatment (kg/d)	1.7E+05
Estimated flow rate of the domestic waste water treatment plant (m3/d)	2.0E+03
Conditions and measures relating to the external treatment of waste destined for disposal	
Combustion emissions limited by the necessary exhaust emission controls. Combustion emissions considered in the regional exposure assessment. The external treatment and disposal of waste must comply with applicable local and/or national regulations.	
Conditions and measures relating to the external recovery of waste	

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This substance is consumed during use and no rejection of the substance is generated.

Section 3 Exposure Estimation

3.1. Health

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

3.2. Environment

The Hydrocarbon Block method was used to calculate environmental exposure with the PETRORISK model.

Section 4 Guidelines to Verify Compliance with the Exposure Scenario

4.1. Health

The projected exposures are not expected to exceed DN(M)EL when the risk management measures/operating conditions set out in Section 2 are implemented.; Where other risk management measures/operating conditions are taken, users should ensure that risks are managed at at least equivalent levels.; The available hazard data do not allow the derivation of a DNEL for skin irritant effects.; The available hazard data do not support the need to establish a DNEL for other health effects; The available hazard data do not allow the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation.

Workers CS 1: Bulk transfers; Dedicated structure (PROC 8b)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3. 729 mg/m ³ (TRA Workers) RCR = 0. 055	Final RCR = 0. 367
	Vapour 1 0-5 00 Pa	16. 44 mg/m ³ (TRA Workers) RCR = 0. 241 Support exposure (not used for RC): 2.3 mg/m ³ (Measured data: Concawe Report No 1/06) 7 mg/m ³ (Measured data: Report concawe No 1/06)	
	Vapour 50 0-10. 000 Pa	4. 806 mg/m ³ (TRA Workers) RCR = 0. 07	
	Vapour >10. 000 Pa	0. 087 mg/m ³ (TRA Workers) RCR = 1. 27 E-3s	
Inhalation, systemic, acute	Aerosol	14. 92 mg/m ³ (TRA Workers) RCR = 3. 48 E-3	Final RCR = 0. 023
	Vapour 1 0-5 00 Pa	65. 77 mg/m ³ (TRA Workers) RCR = 0. 015 Support exposure (not used for RC): 74 mg/m ³ (Measured data: Concawe Report No 1/06) 113 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10. 000 Pa	19. 22 mg/m ³ (TRA Workers) RCR = 4. 48 E-3	
	Vapour >10. 000 Pa	0. 347 mg/m ³ (TRA Workers) RCR = 8. 08 E-5	
Dermal, systemic, long term	Dermal	1. 371 mg/kg bw/day(TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0. 838
Combined routes of exposure, systemic, acute			Final RCR = 0. 023

Workers CS 2: Transfers of drums/lots; Dedicated structure (PROC 8b)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	0. 746 mg/m ³ (TRA Workers) RCR = 0. 011	Final RCR = 0. 042
	Vapour 1 0-5 00 Pa	1. 644 mg/m ³ (TRA Workers) RCR = 0. 024	

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	Vapour 50 0-10.000 Pa	0.481 mg/m ³ (TRA Workers) RCR = 7.03 E-3	
	Vapour >10.000 Pa	8.67 E-3 mg/m ³ (TRA Workers) RCR = 1.27 E-4	
Inhalation, systemic, acute	Aerosol	2.983 mg/m ³ (TRA Workers) RCR = 6.96 E-4	RCR final < 0.01
	Vapour 1 0-5 00 Pa	6.577 mg/m ³ (TRA Workers) RCR = 1.53 E-3	
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 4.48 E-4	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 8.08 E-6	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.513
Combined routes of exposure, systemic, acute			RCR final < 0.01

Workers CS 3: Supply (PROC 8b)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	3.729 mg/m ³ (TRA Workers) RCR = 0.055	Final RCR = 0.367
	Vapour 1 0-5 00 Pa	16.44 mg/m ³ (TRA Workers) RCR = 0.241 Support exposure (not used for RC): 0.35 mg/m ³ (Measured data: Concawe Report No 1/06) 21.5 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	4.806 mg/m ³ (TRA Workers) RCR = 0.07	
	Vapour >10.000 Pa	0.087 mg/m ³ (TRA Workers) RCR = 1.27 E-3s	
Inhalation, systemic, acute	Aerosol	14.92 mg/m ³ (TRA Workers) RCR = 3.48 E-3	Final RCR = 0.023
	Vapour 1 0-5 00 Pa	65.77 mg/m ³ (TRA Workers) RCR = 0.015 Support exposure (not used for RC): 11 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	19.22 mg/m ³ (TRA Workers) RCR = 4.48 E-3	
	Vapour >10.000 Pa	0.347 mg/m ³ (TRA Workers) RCR = 8.08 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.838
Combined routes of exposure,			Final RCR = 0.023

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systemic, acute			
Workers CS 4: General exposures; Closed systems (PROC 2, PROC 1)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	8. 221 mg/m ³ (TRA Workers) RCR = 0. 12 Support exposure (not used for RC): 1.4 mg/m ³ (Measured data: Concawe Report No 1/06) 6 mg/m ³ (Measured data: Report concawe No 1/06) 6 mg/m ³ (Measured data: Report concawe No 1/06) 0. 83 mg/m ³ (Measured data: Concawe Report No 1/06)	Final RCR = 0. 149
	Vapour 50 0-10. 000 Pa	1. 922 mg/m ³ (TRA Workers) RCR = 0. 028	
	Vapour >10. 000 Pa	0. 017 mg/m ³ (TRA Workers) RCR = 2. 54 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	32. 88 mg/m ³ (TRA Workers) RCR = 7. 67 E-3 Support exposure (not used for RC): 44 mg/m ³ (Measured data: Concawe Report No 1/06) 26.7 mg/m ³ (Measured data: Concawe Report No 1/06)	RCR final < 0. 01
	Vapour 50 0-10. 000 Pa	7. 69 mg/m ³ (TRA Workers) RCR = 1. 79 E-3	
	Vapour >10. 000 Pa	0. 069 mg/m ³ (TRA Workers) RCR = 1. 62 E-5	
Dermal, systemic, long term	Dermal	1. 37 mg/kg bw/day(TRA Workers) RCR = 0. 471	Final RCR = 0. 471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0. 62
Combined routes of exposure, systemic, acute			RCR final < 0. 01
Workers CS 5: Use of fuels; Closed systems (PROC 16)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	1. 644 mg/m ³ (TRA Workers) RCR = 0. 024	Final RCR = 0.. 038
	Vapour 50 0-10. 000 Pa	0. 961 mg/m ³ (TRA Workers) RCR = 0. 014	
	Vapour >10. 000 Pa	0. 017 mg/m ³ (TRA Workers) RCR = 2. 54 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	6. 577 mg/m ³ (TRA Workers) RCR = 1. 53 E-3	RCR final < 0. 01
	Vapour 50 0-10. 000 Pa	3. 845 mg/m ³ (TRA Workers) RCR = 8. 97 E-4	
	Vapour >10. 000 Pa	0. 069 mg/m ³ (TRA Workers) RCR = 1. 62 E-5	

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Dermal, systemic, long term	Dermal	0.34 mg/kg bw/day (TRA Workers) RCR = 0.117	Final RCR = 0.117
Dermal, local, long-term	Dermal	0.099 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.099 mg/cm ² (TRA Workers)	
Combined exposure routes, systemic, lungo termine			Final RCR = 0.155
Combined exposure routes, systemic, acute			RCR final < 0.01

Workers CS 6: Cleaning and maintenance of equipment (PROC 8a, PROC 28)

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Aerosol	1.492 mg/m ³ (TRA Workers) RCR = 0.022	Final RCR = 0.171
	Vapour 1 0-5 00 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12 Support exposure (not used for RC): 12.2 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 0.028	
	Vapour >10.000 Pa	0.035 mg/m ³ (TRA Workers) RCR = 5.07 E-4	
Inhalation, systemic, acute	Aerosol	5.966 mg/m ³ (TRA Workers) RCR = 1.39 E-3s	Final RCR = 0.011
	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3 Support exposure (not used for RC): 390 mg/m ³ (Measured data: Concawe Report No 1/06)	
	Vapour 50 0-10.000 Pa	7.69 mg/m ³ (TRA Workers) RCR = 1.79 E-3	
	Vapour >10.000 Pa	0.139 mg/m ³ (TRA Workers) RCR = 3.23 E-5	
Dermal, systemic, long term	Dermal	1.371 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.1 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.1 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.642
Combined routes of exposure, systemic, acute			Final RCR = 0.011

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

Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Vapour 1 0-5 00 Pa	8.221 mg/m ³ (TRA Workers) RCR = 0.12	Final RCR = 0.149
	Vapour 50 0-10.000 Pa	1.922 mg/m ³ (TRA Workers) RCR = 0.028	
	Vapour >10.000 Pa	0.017 mg/m ³ (TRA Workers) RCR = 2.54 E-4	
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	32.88 mg/m ³ (TRA Workers) RCR = 7.67 E-3	RCR final < 0.01
	Vapour 50 0-10.000 Pa	7.69 mg/m ³ (TRA Workers) RCR = 1.79 E-3	

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	Pa		
	Vapour >10.000 Pa	0.069 mg/m ³ (TRA Workers) RCR = 1.62 E-5	
Dermal, systemic, long term	Dermal	1.37 mg/kg bw/day (TRA Workers) RCR = 0.471	Final RCR = 0.471
Dermal, local, long-term	Dermal	0.2 mg/cm ² (TRA Workers)	
Dermal, local, acute	Dermal	0.2 mg/cm ² (TRA Workers)	
Combined routes of exposure, systemic, long-term			Final RCR = 0.62
Combined routes of exposure, systemic, acute			RCR final < 0.01

4.2. Environment

The guidelines are based on presumed operating conditions that may not apply to all sites; therefore, it may be necessary to scale to define appropriate site-specific risk management measures. The required removal efficiency for wastewater can be achieved using on-site/off-site technologies, alone or in combination. The required removal efficiency for air can be achieved using technologies on site, alone or in combination. Further details on scaling and control technologies are provided in the SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Maximum risk characterisation ratio for RCRair air emissions	3.5E-03
Maximum risk characterisation ratio for RCRwater wastewater emissions	4.2E-02

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12c - Use in fuels; Consumers

Section 1	
Title	
12c - Use in fuels; Consumers	
Use descriptor	
Sector(s) of use	
Product Categories	13
Environmental release categories	9a, 9b
Specific category of environmental release	ESVOC SpERC 9.12c.v1
Processes, tasks, activities covered	
Covers consumer uses in liquid fuels	
Evaluation method	
See Section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Control of consumer exposure	
Product features	
Physical form of the product	Liquid
Vapour pressure	-
Concentration of substance in the product	Covers concentrations up to 100.0 % 519]
Frequency and duration of use/exposure	Covers use up to 1.0 events per day 521]
Other operating conditions that affect exposure	-
Product category	Specific risk management measures and operating conditions
General measures (skin irritants)	: Make sure that there is no direct skin contact with the product; Remove accidental contamination of the skin.
General measurements (flammability)	refer to section 2 of the SDS; For measures to control risks arising from physico-chemical properties, please refer to the main body of the SDS, sections 7 and/or 8.
General measures (aspiration hazard)	refer to section 2 of the SDS; Do not swallow. If ingested, seek immediate medical attention.
CS1 Fuels; Liquid; Automotive refueling; (; Diesel;) (PC_13)Based on Concawe_SCED_13_3_a	For each use event, it covers amounts of use up to 44000.0 g/event 520] Duration of exposure = 0.05 h/event. Outdoor use . Assumes that potential dermal contact is limited to the palm of one hand
CS2 Fuels; Liquid; Garden equipment (PC_13)Based on Concawe_SCED_13_4_a	For each use event, it covers amounts of use up to 750.0 g/event 520] Duration of exposure = 0.033 h/event. Assumes that potential dermal contact is limited inside the hand/one hand/palm.
CS3 Fuels; Liquid; Home room heater (PC_13)Based on Concawe_SCED_13_5_a	For each usage event, it covers usage amounts up to 3320.0 g/event 520] Duration of exposure = 0.033 h/event . Assumes that potential dermal contact is limited to the palm of a hand
Section 2.2 Monitoring of environmental exposure	
Product features	
The substance is UVCB complex. Predominantly hydrophobic.	
Quantities used	
Fraction of EU tonnage used in the region	0,1
Tonnage for regional use (tonnes/year)	1.8E+07
Fraction of regional tonnage used locally	5.0E-04
Annual tonnage of the site (tons/year)	9.1E+03
Maximum daily amount of the site (kg/day)	2.5E+04
Frequency and duration of use	
Continuous release.	
Issue days (days/year)	365
Environmental factors not affected by risk management	
Local freshwater dilution factor	10
Local seawater dilution factor	100
Other operating conditions that affect environmental exposure	
Release of the fraction into the air from wide dispersive use (for regional use only)	1.0E-04
Release of the fraction into wastewater from extensive dispersive use	2.0E-07
Release fraction into soil from wide dispersive use (for regional use only)	0.00005

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Conditions and measures relating to the local waste water treatment plant			
Not applicable as there is no release to wastewater.			
Estimated removal of substances from wastewater through domestic wastewater treatment (%)	94,8		
Maximum permissible tonnage of the site (MSafe) based on release after total removal of wastewater treatment (kg/d)	6.1E+05		
Estimated flow rate of the domestic waste water treatment plant (m3/d)	2.0E+03		
Conditions and measures relating to the external treatment of waste destined for disposal			
Combustion emissions limited by the necessary exhaust emission controls. Combustion emissions considered in the regional exposure assessment. The external treatment and disposal of waste must comply with applicable local and/or national regulations.			
Conditions and measures relating to the external recovery of waste			
This substance is consumed during use and no rejection of the substance is generated.			
Section 3 Exposure Estimation			
3.1. Health			
The ECETOC TRA tool has been used to estimate consumer exposures, unless otherwise stated.			
3.2. Environment			
The Hydrocarbon Block method was used to calculate environmental exposure with the PETRORISK model.			
Section 4 Guidelines to Verify Compliance with the Exposure Scenario			
4.1. Health			
The projected exposures are not expected to exceed DN(M)EL when the risk management measures/operating conditions set out in Section 2 are implemented.; The available hazard data do not allow the derivation of a DNEL for skin irritant effects.; The available hazard data do not support the need to establish a DNEL for other health effects; The available hazard data do not allow the derivation of a DNEL for aspiration effects.; Risk management measures are based on qualitative risk characterisation.			
Cons CS 1: fuels; Liquid; Car refueling; (; Diesel;) (PC 13)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	0. 536 mg/m ³ (TRA Consumers) RCR = 0. 027 Support exposure (not used for RC): 0. 26 mg/m ³ (Measured data: Concawe Report No 1/06)	Final RCR = 0. 027
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	257.3 mg/m ³ (ECETOC TRA Consumers 3. 1) RCR = 0. 1	Final RCR = 0. 1
Dermal, systemic, long-term	Dermal	0. 175 mg/kg bw/day (TRA Consumers) RCR = 0. 14	Final RCR = 0. 14
Oral, systemic, long-term	Dermal	0 mg/kg bw/day(TRA Consumers) RCR = 0	RCR final < 0. 01
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 167
Combined exposure routes, systemic, acute			Final RCR = 0. 1
Cons CS 2: fuels; Liquid; Garden equipment (PC 13)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	0. 504 mg/m ³ (TRA Consumers) RCR = 0. 025	Final RCR = 0. 025
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	362.9 mg/m ³ (ECETOC TRA Consumers 3. 1) RCR = 0. 141	Final RCR = 0. 141
Dermal, systemic, long-term	Dermal	0. 071 mg/kg bw/day(TRA Consumers) RCR = 0. 057	Final RCR = 0. 057
Oral, systemic, long-term	Dermal	0 mg/kg bw/day(TRA Consumers) RCR = 0	RCR final < 0. 01
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 082
Combined exposure routes, systemic, acute			Final RCR = 0. 141

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Cons CS 3: fuels; Liquid; Stovesand domestic (PC 13)			
Route of exposure and type of effect	Rated entity	Exposure concentration	Risk quantification
Inhalation, systemic, long-term	Vapour 1 0-5 00 Pa	1. 488 mg/m ³ (TRA Consumers) RCR = 0.074	Final RCR = 0.074
Inhalation, systemic, acute	Vapour 1 0-5 00 Pa	1. 07E3 mg/m ³ (ECETOC TRA Consumers 3. 1) RCR = 0. 416	Final RCR = 0. 416
Dermal, systemic, long-term	Dermal	0. 035 mg/kg bw/day(TRA Consumers) RCR = 0. 028	Final RCR = 0. 028
Oral, systemic, long term	Dermal	0 mg/kg bw/day(TRA Consumers) RCR = 0	RCR final < 0. 01
Combined exposure routes, systemic, lungo termine			Final RCR = 0. 102
Combined exposure routes, systemic, acute			Final RCR = 0. 416
4.2. Environment			
The guidelines are based on presumed operating conditions that may not apply to all sites; therefore, it may be necessary to scale to define appropriate site-specific risk management measures.			
Maximum risk characterisation ratio for RCRair air emissions			3.0E-03
Maximum risk characterisation ratio for RCRwater wastewater emissions			4.1E-02

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Exposure Scenarios for EC 941-364-9

identified Use	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
01 – Manufacture of Substance	Manufacture	-	-	1, 2, 3, 4, 8a, 8b, 9, 15	1	-
02- Formulation or re-packing - Formulation & (re)packing of substances and mixtures	Industrial	-	-	8a, 8b, 9, 14, 15, 28	2	-
04 - Use as a fuel; industrial	Industrial	-	-	1, 2, 3, 8a, 8b, 16	7	-
05 - Use as a fuel; professional	Professional	-	-	1, 2, 3, 8a, 8b, 16	9b	-
06 - Use as a fuel; consumer	Consumer	-	13	-	9a, 9b	-

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1: Manufacture – Manufacture

Environment contributing scenario(s):		
CS 1	Manufacture of substances	ERC 1
Worker contributing scenario(s):		
CS 2	General exposures (closed systems)	PROC 1
CS 3	General exposures (closed systems)	PROC 2
CS 4	General exposures (closed systems)	PROC 3
CS 5	General exposures	PROC 4
CS 6	Process sampling	PROC 8b , PROC 9
CS 7	Laboratory activities	PROC 15
CS 8	Bulk transfers	PROC 8b
CS 9	Equipment cleaning and maintenance	PROC 8a , PROC 28
CS 10	Storage	PROC 1
CS 11	Storage	PROC 2

Further description of the use:

Manufacture of the substance. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities [GES1_I].

1.1.Env CS 1: Manufacture of substances (ERC 1)

1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: $\leq 3.5E3$ tonnes/day
• Annual use amount at site: $\leq 1.05E6$ t(tonnes)/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 97.27%]
• Discharge rate of STP: $\geq 2E3$ m ³ /day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /day

1.1.2.Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 1 Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 3E-3% Release factor after on site RMM: 3E-3% Local release rate: 105 kg/day

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Release	Release estimation method	Explanations
Air	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 0.1% Release factor after on site RMM: 0.1% Local release rate: 3.5E3 kg/day
Non agricultural soil	ERC	Release factor after on site RMM: 0.01%

1.1.3. Exposure and risks for the environment and man via the environment

No exposure datasets are defined for this environmental contributing scenario.

Risk characterisation

Qualitative risk characterisation (Fresh water, Sediment (freshwater), Marine water, Sediment (marine water), Sewage Treatment Plant, Agricultural soil):

See Annex 4 for complete PETRORISK 8.1 modelling for environmental compartment.

1.2. Worker CS 2: General exposures (closed systems) (PROC 1)

1.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

1.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 2 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

1.3. Worker CS 3: General exposures (closed systems) (PROC 2)

1.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 3 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

1.4. Worker CS 4: General exposures (closed systems) (PROC 3)

1.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 4 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	25 mg/m ³ (TRA Workers)	RCR = 0.366
Inhalation, systemic, acute	100 mg/m ³ (TRA Workers)	RCR = 0.023
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers)	RCR = 0.047
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.413

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 400 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

1.5. Worker CS 5: General exposures (PROC 4)

1.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Provide extract ventilation to points where emissions occur [E54].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 5 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	16.66 mg/m ³ (TRA Workers)	RCR = 0.244
Inhalation, systemic, acute	66.66 mg/m ³ (TRA Workers)	RCR = 0.016
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.715

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

1.6. Worker CS 6: Process sampling (PROC 8b, PROC 9)

1.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

1.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 6 Exposure concentrations and risks for workers

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	583.3 mg/m ³ (TRA Workers)	RCR = 0.136
Dermal, systemic, long term	0.548 mg/kg bw/day (TRA Workers)	RCR = 0.188
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.615

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

1.7. Worker CS 7: Laboratory activities (PROC 15)

1.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

1.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 7 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	58.33 mg/m ³ (TRA Workers)	RCR = 0.854
Inhalation, systemic, acute	233.3 mg/m ³ (TRA Workers)	RCR = 0.054

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers)	RCR = 0.023
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.877

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

1.8. Worker CS 8: Bulk transfers (PROC 8b)

1.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, enclosing hood with very high effectiveness such as fume cupboard (assumed effectiveness >= 95%) <i>Ensure material transfers are under containment or extract ventilation [E66].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

1.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 8 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	10.41 mg/m ³ (TRA Workers)	RCR = 0.152
Inhalation, systemic, acute	41.66 mg/m ³ (TRA Workers)	RCR < 0.01

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.624

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 95 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

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

1.9.1 Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance [E55]</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

1.10. Worker CS 10: Storage (PROC 1)

1.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed process without likelihood of exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 10 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

1.11. Worker CS 11: Storage (PROC 2)

1.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed process without likelihood of exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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1.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 11 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

If the conditions set out in Section 9.0.4.2 are adhered to and dermal and eye protection, as applied in each contributing scenario, are used then any risks arising from inhalation, dermal and eye hazards are considered to be controlled and safe use is achieved.

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

Environment contributing scenario(s):		
CS 1	Formulation	ERC 2
Worker contributing scenario(s):		
CS 2	General exposures (closed systems)	PROC 1
CS 3	General exposures (closed systems)	PROC 2
CS 4	General exposures (closed systems)	PROC 3
CS 5	General exposures	PROC 4
CS 6	Batch process; Elevated temperature; Use in contained systems	PROC 3
CS 7	Process sampling	PROC 9 , PROC 3
CS 8	Laboratory activities	PROC 15
CS 9	Bulk transfers; Dedicated facility	PROC 8b
CS 10	Mixing operations (closed systems)	PROC 5
CS 11	Manual; Transfer from/pouring from containers; Non-dedicated facility	PROC 8a
CS 12	Drum/batch transfers; Dedicated facility	PROC 8b
CS 13	Tabletting, compression, extrusion or pelletisation	PROC 14
CS 14	Drum and small package filling	PROC 9
CS 15	Equipment cleaning and maintenance	PROC 8a , PROC 28
CS 16	Storage	PROC 1
CS 17	Storage	PROC 2

Further description of the use:

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities [GES2_I]

2.1.Env CS 1: Formulation (ERC 2)

2.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: $\leq 1.17E3$ tonnes/day
• Annual use amount at site: $\leq 3.51E5$ (tonnes)/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 97.27%]
• Discharge rate of STP: $\geq 2E3$ m ³ /day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /day

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2.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 1 Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 4E-5% Release factor after on site RMM: 4E-5% Local release rate: 0.468 kg/day
Air	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 0.5% Release factor after on site RMM: 0.5% Local release rate: 5.85E3 kg/day
Non agricultural soil	ERC	Release factor after on site RMM: 0.01%

2.1.3. Exposure and risks for the environment and man via the environment

No exposure datasets are defined for this environmental contributing scenario.

Risk characterisation

Qualitative risk characterisation (Fresh water, Sediment (freshwater), Marine water, Sediment (marine water), Sewage Treatment Plant, Agricultural soil)

2.2. Worker CS 2: General exposures (closed systems) (PROC 1)

2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 2 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.3. Worker CS 3: General exposures (closed systems) (PROC 2)

2.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 3. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

2.4. Worker CS 4: General exposures (closed systems) (PROC 3)

2.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table - 4 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	58.33 mg/m ³ (TRA Workers)	RCR = 0.854
Inhalation, systemic, acute	233.3 mg/m ³ (TRA Workers)	RCR = 0.054
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers)	RCR = 0.047
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.901

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.5. Worker CS 5: General exposures (PROC 4)

2.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Provide extract ventilation to points where emissions occur [E54].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table - 5 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	16.66 mg/m ³ (TRA Workers)	RCR = 0.244
Inhalation, systemic, acute	66.66 mg/m ³ (TRA Workers)	RCR = 0.016
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.715

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.6. Worker CS 6: Batch process; Elevated temperature; Use in contained systems (PROC 3)

2.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C	TRA Workers 3.0

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2.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 6 - Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers)	RCR = 0.047
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.657

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (60°C) used for the calculation is 1E4 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.7. Worker CS 7: Process sampling (PROC 9, PROC 3)

2.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Enhanced (5 to 10 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table - 7 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	25 mg/m ³ (TRA Workers)	RCR = 0.366
Inhalation, systemic, acute	500 mg/m ³ (TRA Workers)	RCR = 0.117
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.46

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.8. Worker CS 8: Laboratory activities (PROC 15)

2.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table - 8 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	58.33 mg/m ³ (TRA Workers)	RCR = 0.854
Inhalation, systemic, acute	233.3 mg/m ³ (TRA Workers)	RCR = 0.054
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers)	RCR = 0.023
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.877

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.9. Worker CS 9: Bulk transfers; Dedicated facility (PROC 8b)

2.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, enclosing hood with very high effectiveness such as fume cupboard (assumed effectiveness >= 95%)	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table- 9 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	10.41 mg/m ³ (TRA Workers)	RCR = 0.152
Inhalation, systemic, acute	41.66 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.624

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 95 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.10. Worker CS 10: Mixing operations (closed systems) (PROC 5)

2.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Provide extract ventilation to points where emissions occur [E54].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 10 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.11. Worker CS 11: Manual; Transfer from/pouring from containers; Non-dedicated facility (PROC 8a)

2.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Provide extract ventilation to material transfer points and other openings [E82].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 11 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.12. Worker CS 12: Drum/batch transfers; Dedicated facility (PROC 8b)

2.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, enclosing hood with very high effectiveness such as fume cupboard (assumed effectiveness >= 95%) <i>Provide extract ventilation to points where emissions occur [E54].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 12 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	10.41 mg/m ³ (TRA Workers)	RCR = 0.152
Inhalation, systemic, acute	41.66 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.624

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 95 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.13. Worker CS 13: Tableting, compression, extrusion or pelletisation (PROC 14)

2.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Handle substance within a predominantly closed system provided with extract ventilation [E49].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 13 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.236
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.845

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

2.14. Worker CS 14: Drum and small package filling (PROC 9)

2.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 14 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.2 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

2.15. Worker CS 15: Equipment cleaning and maintenance (PROC 8a, PROC 28)

2.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance [E55]</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 15 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

2.16. Worker CS 16: Storage (PROC 1)

2.16.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed process without likelihood of exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table16 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

2.17. Worker CS 17: Storage (PROC 2)

2.17.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

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2.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 17 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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4: Use at industrial sites - Use as a fuel

Environment contributing scenario(s):		
CS 1	Industrial use of substances in closed systems	ERC 7
Worker contributing scenario(s):		
CS 2	Bulk transfers; Dedicated facility	PROC 8b
CS 3	Drum/batch transfers; Dedicated facility	PROC 8b
CS 4	General exposures (closed systems)	PROC 1
CS 5	General exposures (closed systems)	PROC 2
CS 6	Using material as fuel sources, limited exposure to unburned product to be expected; Closed systems	PROC 16
CS 7	Equipment cleaning and maintenance	PROC 8a , PROC 28
CS 8	Storage	PROC 1
CS 9	Storage	PROC 2

Further description of the use:

Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste [GES12_I].

4.1. Env CS 1: Industrial use of substances in closed systems (ERC 7)

4.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: $\leq 4.33E3$ tonnes/day
• Annual use amount at site: $\leq 1.3E6$ (tonnes)/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 97.27%]
• Discharge rate of STP: $\geq 2E3$ m ³ /day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /day

4.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 1 Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 9E-6% Release factor after on site RMM: 9E-6% Local release rate: 0.39 kg/day
Air	Estimated release factor (Maximum allowable release)	Release factor before on site RMM: 0.45% Release factor after on site RMM: 0.45% Local release rate: 1.95E4 kg/day

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Release	Release estimation method	Explanations
Non agricultural soil	Estimated release factor (Maximum allowable release)	Release factor after on site RMM: 0%

4.1.3. Exposure and risks for the environment and man via the environment

No exposure datasets are defined for this environmental contributing scenario.

Risk characterisation

Qualitative risk characterisation (Fresh water, Sediment (freshwater), Marine water, Sediment (marine water), Sewage Treatment Plant, Agricultural soil):

See Annex 4 for complete PETRORISK 8.1 modelling for environmental compartment.

4.2. Worker CS 2: Bulk transfers; Dedicated facility (PROC 8b)

4.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, enclosing hood with very high effectiveness such as fume cupboard (assumed effectiveness >= 95%) <i>Ensure material transfers are under containment or extract ventilation [E66].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 2 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	10.41 mg/m ³ (TRA Workers)	RCR = 0.152
Inhalation, systemic, acute	41.66 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.624

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 95 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.3. Worker CS 3: Drum/batch transfers; Dedicated facility (PROC 8b)

4.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Enhanced (5 to 10 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 3 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	37.5 mg/m ³ (TRA Workers)	RCR = 0.549
Inhalation, systemic, acute	250 mg/m ³ (TRA Workers)	RCR = 0.058
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.283
Dermal, local, long term	0.06 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, acute	0.06 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.831

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.4. Worker CS 4: General exposures (closed systems) (PROC 1)

4.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 4 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.5. Worker CS 5: General exposures (closed systems) (PROC 2)

4.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 5 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.6. Worker CS 6: Using material as fuel sources, limited exposure to unburned product to be expected; Closed systems (PROC 16)

4.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 6 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers)	RCR = 0.023
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.633

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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

4.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance [E55]</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 7 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.8. Worker CS 8: Storage (PROC 1)

4.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed process without likelihood of exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 8 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

4.9. Worker CS 9: Storage (PROC 2)

4.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

4.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	41.66 mg/m ³ (TRA Workers)	RCR = 0.61
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.704

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5. Exposure scenario: Widespread use by professional workers - Use as a fuel

Environment contributing scenario(s):		SPERC
CS 1	Use as a fuel	ERC 9b, ERC 9a ESVOC SPERC 9.12b.v3
Worker contributing scenario(s):		
CS 2	Bulk transfers; Dedicated facility	PROC 8b
CS 3	Drum/batch transfers; Dedicated facility	PROC 8b
CS 4	Refuelling	PROC 8b
CS 5	General exposures (closed systems)	PROC 1
CS 6	General exposures (closed systems)	PROC 2
CS 7	Using material as fuel sources, limited exposure to unburned product to be expected; Closed systems	PROC 16
CS 8	Equipment maintenance	PROC 8a, PROC 28
CS 9	Storage	PROC 1
CS 10	Storage	PROC 2

Further description of the use:

Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste [GES12_P].

5.1. Env CS 1: Use as a fuel (ERC 9b, ERC 9a)

5.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
<ul style="list-style-type: none"> Percentage of EU tonnage used at regional scale: = 10 % <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf Percentage of Regional tonnage used at local scale: = 0.05 % <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf Daily local widespread use amount: <= 0.027 tonnes/day <i>Amount of substance use per day: Supplied by registrant</i> <i>Fraction of Regional tonnage used locally: 0.05% (default value) / Number of emission days per year: 365 (default)</i> <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf
Technical and organisational conditions and measures
<ul style="list-style-type: none"> RMM limiting release to air: no obligatory RMMs <i>no obligatory RMMs</i> <i>Emissions to air are minimized when the product is used in accordance with the manufacturers' instructions and / or the established practices.</i> <i>TSSA (2018). Procedure for the Handling of Fuel at Construction Sites. Technical Standards and Safety Authority, Civil Engineering Sector Labour-Management Health and Safety Committee. Toronto, Canada.</i>

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<ul style="list-style-type: none">• RMM limiting release to water: The release to water is modified after biological treatment at a standard municipal sewage treatment plant (STP) with an effluent flow rate of 2,000 m³ /day <i>By default, the release to water is modified after biological treatment at a standard municipal sewage treatment plant (STP) with an effluent flow rate of 2,000 m³ /day. The effluent discharge rate is applicable to a group of 10,000 inhabitants who generate 200 L of wastewater per person.</i> <i>The removal efficiency is provided by the SimpleTreat model, which takes into consideration the biodegradability, partitioning behaviour, and volatility of an organic substance. Degradation assumes the operation of an aerobic activated-sludge reactor under steady-state conditions.</i> <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf
<ul style="list-style-type: none">• RMM limiting release to soil: No obligatory RMMs <i>No obligatory RMMs</i> <i>Emissions to soil are minimized when the product is used in accordance with the manufacturers' instructions and / or the established practices.</i> <i>TSSA (2018). Procedure for the Handling of Fuel at Construction Sites. Technical Standards and Safety Authority, Civil Engineering Sector Labour-Management Health and Safety Committee. Toronto, Canada.</i>
Conditions and measures related to biological sewage treatment plant
<ul style="list-style-type: none">• Biological STP: Standard [Effectiveness Water: 97.27%]
Conditions and measures related to external treatment of waste (including article waste)
<ul style="list-style-type: none">• Particular considerations on the waste treatment operations: Other <i>Unused and spent products and solutions should be appropriately labelled and stored for eventual recovery or disposal as hazardous waste. A suitable unbreakable and closable container should be used when storing and shipping hazardous materials. The containers must be solvent compatible, leakproof, and free of any defects. Contaminated debris such as disposable paper towels, brushes, rollers, masks, transfer vessels, and wipes that may contain small amounts of solvent residue need to be handled as hazardous waste and properly disposed of in a manner that is consistent with local, regional, and national regulations. Direct disposal of waste into a municipal sewer system needs to conform with all applicable laws and regulations. A spill plan needs to be available that outlines the steps to be taken to minimize any potential health and environmental threats.</i> <i>EPA (2001). Managing Your Hazardous Waste: A Guide for Small Businesses. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Washington, DC.</i> https://www.epa.gov/sites/production/files/2014-12/documents/k01005.pdf
Other conditions affecting environmental exposure
<ul style="list-style-type: none">• Place of use: Indoor/Outdoor <i>Indoor/Outdoor use</i>
<ul style="list-style-type: none">• Water contact during use: Yes <i>water contact during use</i>

5.1.2. Releases

The releases have been estimated on the basis of SPERC ESVOG SPERC 9.12b.v3: Use as a fuel (professional): solvent-borne

Description of activities/processes covered by the SPERC

Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste and consumer uses in liquid fuels.

Product/substance domain:

Substance types / functions / properties included or excluded

Applicable to petroleum substances and petrochemicals.

Additional specification of product types covered: Includes a variety of aliphatic and aromatic hydrocarbons, ketones, alcohols, acetates, glycols, glycol ethers, and glycol ether acetates.

Inclusion of sub-SPERCs:

2 ERCs -9a and 9b- covered by same sub-SPERC

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Sub-SPERC: ESVOC 9.12b.v3:

The local releases to the environment are reported in the following table.

Table 1 Local releases to the environment

Release	Explanations
Water	<p>Release factor: 1E-4%</p> <p>Local release rate: 2.74E-5 kg/day</p> <p>Explanation: The water and soil release factors examined the fuel spillages at service stations using conventional dispensing equipment with no vapor recovery capabilities. The lost fuel was distributed to water and soil after adjusting for the amount available for evaporation. Partitioning to the remaining environmental compartments was estimated using a multimedia fugacity model.</p> <p>Morgester, J.J., et al. (1992). Comparison of spill frequencies and amounts at vapor recovery and conventional service stations in California. Journal of the Air & Waste Management Association 42, 284-289.</p> <p>Hilpert, M., and Breyse, P.N. (2014). Infiltration and evaporation of small hydrocarbon spills at gas stations. Journal of Contaminant Hydrology 170, 39-52.</p>
Air	<p>Release factor: 0.5%</p> <p>Local release rate: - kg/day</p> <p>Explanation: The value has been derived from published emission factors for the combustion of different fuel types; including gasoline, diesel, and kerosene. Those exhaust and/or evaporative emissions reported in grams per mile were converted to grams per gram of fuel combusted by adjusting for the average fuel efficiency in the applicable vehicle fleet.</p> <p>ANL (2015). The GREET Model Expansion for Wheels-to Wheels Analysis of Heavy-Duty Vehicles. Argonne National Laboratory. Argonne, IL. https://greet.es.anl.gov/publication-heavy-duty</p> <p>EASA (2019). ICAO Aircraft Engine Emissions Databank. European Union Aviation Safety Agency. Cologne, Germany. July 30, 2019. https://www.easa.europa.eu/easa-and-you/environment/icao-aircraft-engine-emissions-databank</p>
Non agricultural soil	<p>Release factor: 0.025%</p> <p>Local release rate: - kg/day</p> <p>Explanation: The water and soil release factors examined the fuel spillages at service stations using conventional dispensing equipment with no vapor recovery capabilities. The lost fuel was distributed to water and soil after adjusting for the amount available for evaporation. Partitioning to the remaining environmental compartments was estimated using a multimedia fugacity model.</p> <p>Morgester, J.J., et al. (1992). Comparison of spill frequencies and amounts at vapor recovery and conventional service stations in California. Journal of the Air & Waste Management Association 42, 284-289.</p> <p>Hilpert, M., and Breyse, P.N. (2014). Infiltration and evaporation of small hydrocarbon spills at gas stations. Journal of Contaminant Hydrology 170, 39-52.</p>

Releases to waste

Release factor to external waste: 2 %

The waste factor has been taken from a life cycle assessment of gasoline production and use in passenger cars (Morales, 2015). The evaluation revealed that 2.1 ml of hazardous waste was incinerated per km driven. The stated fuel mileage of 150 ml/km yields a waste release factor of 1.4%, which was rounded upward to 2%. An uncertainty factor has not been applied to this value since the waste associated with industrial fuel use is expected to be less than the value obtained for this comprehensive analysis.

Morales, M. et al. (2015). Life cycle assessment of gasoline production and use in Chile. Science of the Total Environment 505, 833-843

5.1.3. Exposure and risks for the environment and man via the environment

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No exposure datasets are defined for this environmental contributing scenario.

Risk characterisation

Qualitative risk characterisation (Fresh water, Sediment (freshwater), Marine water, Sediment (marine water), Sewage Treatment Plant, Agricultural soil):

See Annex 4 for complete PETRORISK 8.1 modelling for environmental compartment.

5.2. Worker CS 2: Bulk transfers; Dedicated facility (PROC 8b)

5.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%) <i>Ensure material transfers are under containment or extract ventilation [E66].</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 2 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	25 mg/m ³ (TRA Workers)	RCR = 0.366
Inhalation, systemic, acute	166.6 mg/m ³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.283
Dermal, local, long term	0.06 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.648

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

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Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

5.3. Worker CS 3: Drum/batch transfers; Dedicated facility (PROC 8b)

5.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Enhanced (5 to 10 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 3 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	25 mg/m ³ (TRA Workers)	RCR = 0.366
Inhalation, systemic, acute	500 mg/m ³ (TRA Workers)	RCR = 0.117
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.46

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

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Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute):

5.4. Worker CS 4: Refuelling (PROC 8b)

5.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: $\leq 100\%$	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: ≤ 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness $\geq 90-95\%$)	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness $\geq 90\%$)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: $\leq 25\text{ }^{\circ}\text{C}$	TRA Workers 3.0

5.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 4 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	29.16 mg/m ³ (TRA Workers)	RCR = 0.427
Inhalation, systemic, acute	116.6 mg/m ³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.471
Dermal, local, long term	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.898

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 90 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.5. Worker CS 5: General exposures (closed systems) (PROC 1)

5.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 5 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.6. Worker CS 6: General exposures (closed systems) (PROC 2)

5.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Enhanced (5 to 10 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 6 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	30 mg/m ³ (TRA Workers)	RCR = 0.439
Inhalation, systemic, acute	200 mg/m ³ (TRA Workers)	RCR = 0.047
Dermal, systemic, long term	0.164 mg/kg bw/day (TRA Workers)	RCR = 0.056
Dermal, local, long term	0.024 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.024 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.495

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.7. Worker CS 7: Using material as fuel sources, limited exposure to unburned product to be expected; Closed systems (PROC 16)

5.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 7 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	58.33 mg/m ³ (TRA Workers)	RCR = 0.854
Inhalation, systemic, acute	233.3 mg/m ³ (TRA Workers)	RCR = 0.054
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers)	RCR = 0.023
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.877

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.8. Worker CS 8: Equipment maintenance (PROC 8a, PROC 28)

5.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: Yes, specifically designed LEV such as receiving hoods (assumed effectiveness >= 80-90%) <i>LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance [E55]</i>	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 8 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	33.33 mg/m ³ (TRA Workers)	RCR = 0.488
Inhalation, systemic, acute	666.6 mg/m ³ (TRA Workers)	RCR = 0.155
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.582

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 80 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.9. Worker CS 9: Storage (PROC 1)

5.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed process without likelihood of exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.083 mg/m ³ (TRA Workers)	RCR < 0.01
Inhalation, systemic, acute	0.333 mg/m ³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	6.8E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	1.98E-3 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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5.10. Worker CS 10: Storage (PROC 2)

5.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Enhanced (5 to 10 ACH)	TRA Workers 3.0
• Closed continuous process with occasional controlled exposure <i>Store substance within a closed system [E84].</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (effectiveness >= 80%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: Eye protection	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C	TRA Workers 3.0

5.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 10 Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	50 mg/m ³ (TRA Workers)	RCR = 0.732
Inhalation, systemic, acute	200 mg/m ³ (TRA Workers)	RCR = 0.047
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers)	RCR = 0.094
Dermal, local, long term	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.04 mg/cm ² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.826

Remarks on exposure dataset obtained with ECETOC TRA

The vapour pressure at operating temperature (25°C) used for the calculation is 1.05E3 Pa.

Local exhaust ventilation effectiveness used by TRA: inhalation 0 %

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term, Dermal, local, acute)

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6. Exposure scenario: Consumer use - Use as a Fuel

Environment contributing scenario(s):		SPERC
CS 1	Use as a Fuel	ERC 9b, ERC 9a ESVOC SPERC 9.12c.v3
Consumer contributing scenario(s):		
CS 2	Fuels	PC 13

6.1. Env CS 1: Use as a Fuel (ERC 9b, ERC 9a)

6.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
<ul style="list-style-type: none"> Percentage of EU tonnage used at regional scale: = 10 % <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf
<ul style="list-style-type: none"> Percentage of Regional tonnage used at local scale: = 0.05 % <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf
<ul style="list-style-type: none"> Daily local widespread use amount: <= 0.028 tonnes/day <i>Amount of substance use per day: Supplied by registrant</i> <i>Fraction of Regional tonnage used locally: 0.05% (default value) / Number of emission days per year: 365 (default)</i> <i>ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment</i> <i>Version 3.0. European Chemicals Agency. Helsinki, Finland.</i> https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf
Conditions and measures related to external treatment of waste (including article waste)
<ul style="list-style-type: none"> Particular considerations on the waste treatment operations: Other <i>Although household hazardous waste (HHW) represents a small portion of the total domestic waste produced by consumers, it needs to be separated from normal trash and amassed for special handling. Many regional municipalities have established voluntary procedures for the identification, collection, and disposal of HHW in a safe and efficient manner. Once amassed, the HHW can be transported to collection sites where it is reused, recycled, or incinerated. The handling and disposal of hazardous waste needs to conform with established practices and local/regional regulations in order to minimize environmental release and the potential for ecological harm.</i> <i>Inglezakis, V.J., Moustakas, K. (2015). Household hazardous waste management: A review. Journal of Environmental Management 150, 310-321. doi: 10.1016/j.jenvman.2014.11.021.</i>
Other conditions affecting environmental exposure
<ul style="list-style-type: none"> Biological STP: Standard [Effectiveness Water: 97.27%]
<ul style="list-style-type: none"> Place of use: Indoor/Outdoor <i>Indoor/Outdoor use</i>
<ul style="list-style-type: none"> Water contact during use: Yes <i>water contact during use</i>
<ul style="list-style-type: none"> RMM limiting release to air: no obligatory RMMs <i>no obligatory RMMs</i> <i>Emissions to air are minimized when the product is used in accordance with the manufacturers' instructions and / or the established practices.</i> <i>TSSA (2018). Procedure for the Handling of Fuel at Construction Sites. Technical Standards and Safety Authority, Civil Engineering Sector Labour-Management Health and Safety Committee. Toronto, Canada.</i>

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- RMM limiting release to soil: No obligatory RMMs

No obligatory RMMs

Emissions to soil are minimized when the product is used in accordance with the manufacturers' instructions and / or the established practices.

TSSA (2018). Procedure for the Handling of Fuel at Construction Sites. Technical Standards and Safety Authority, Civil Engineering Sector Labour-Management Health and Safety Committee. Toronto, Canada.

- RMM limiting release to water: The release to water is modified after biological treatment at a standard municipal sewage treatment plant (STP) with an effluent flow rate of 2,000 m³ /day

By default, the release to water is modified after biological treatment at a standard municipal sewage treatment plant (STP) with an effluent flow rate of 2,000 m³ /day. The effluent discharge rate is applicable to a group of 10,000 inhabitants who generate 200 L of wastewater per person.

The removal efficiency is provided by the SimpleTreat model, which takes into consideration the biodegradability, partitioning behaviour, and volatility of an organic substance. Degradation assumes the operation of an aerobic activated-sludge reactor under steady-state conditions.

ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16:

Environmental Exposure Assessment Version 3.0. European Chemicals Agency. Helsinki, Finland.

https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf

6.1.2. Releases

The releases have been estimated on the basis of SPERC ESVOC SPERC 9.12c.v3: Use as a fuel (consumer): solvent-borne

Description of activities/processes covered by the SPERC

Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste and consumer uses in liquid fuels.

Product/substance domain:

Substance types / functions / properties included or excluded

Applicable to petroleum substances and petrochemicals.

Additional specification of product types covered: Includes a variety of aliphatic and aromatic hydrocarbons, ketones, alcohols, acetates, glycols, glycol ethers, and glycol ether acetates.

Inclusion of sub-SPERCs

Yes (2 ERCs -9a and 9b- covered by same sub-SPERC)

Sub-SPERC: ESVOC 9.12c.c.v3: VP < 500 Pa

The local releases to the environment are reported in the following table.

Table 1 Local releases to the environment

Release	Explanations
Water	<p>Release factor: 2E-5%</p> <p>Local release rate: 5.56E-6 kg/day</p> <p>Explanation:</p> <p>The water and soil release factors examined the fuel spillages at service stations using conventional dispensing equipment with no vapor recovery capabilities. The lost fuel was distributed to water and soil after adjusting for the amount available for evaporation. Partitioning to the remaining environmental compartments was estimated using a multimedia fugacity model.</p> <p>Morgester, J.J., et al. (1992). Comparison of spill frequencies and amounts at vapor recovery and conventional service stations in California. Journal of the Air & Waste Management Association 42, 284-289.</p> <p>Hilpert, M., and Breyse, P.N. (2014). Infiltration and evaporation of small hydrocarbon spills at gas stations. Journal of Contaminant Hydrology 170, 39-52.</p>

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Release	Explanations
Air	<p>Release factor: 0.01%</p> <p>Local release rate: - kg/day</p> <p>Explanation:</p> <p>The value has been derived from a published emission factor for the evaporative and exhaust-related release of gasoline hydrocarbons from passenger vehicles. Emissions reported in grams per mile were converted to grams per gram of fuel combusted by adjusting for the average fuel efficiency in an applicable fleet of vehicles.</p> <p>ANL (2013). Updated Emission Factors of Air Pollutants from Vehicle Operations in GREET Using MOVES. Argonne National Laboratory. Argonne, IL. https://greet.es.anl.gov/publication-vehicles-13</p> <p>NimbleFins (2019). Average MPG of Cars 2019. NimbleFins Limited. London, United Kingdom. 24 July, 2019. https://www.nimblefins.co.uk/average-mpg</p>
Non agricultural soil	<p>Release factor: 5E-3%</p> <p>Local release rate: - kg/day</p> <p>Explanation:</p> <p>The water and soil release factors examined the fuel spillages at service stations using conventional dispensing equipment with no vapor recovery capabilities. The lost fuel was distributed to water and soil after adjusting for the amount available for evaporation. Partitioning to the remaining environmental compartments was estimated using a multimedia fugacity model.</p> <p>Morgester, J.J., et al. (1992). Comparison of spill frequencies and amounts at vapor recovery and conventional service stations in California. Journal of the Air & Waste Management Association 42, 284-289.</p> <p>Hilpert, M., and Breyse, P.N. (2014). Infiltration and evaporation of small hydrocarbon spills at gas stations. Journal of Contaminant Hydrology 170, 39-52.</p>

Releases to waste

Release factor to external waste: 2 %

The waste factor has been taken from a life cycle assessment of gasoline production and use in passenger cars (Morales, 2015). The evaluation revealed that 2.1 ml of hazardous waste was incinerated per km driven. The stated fuel mileage of 150 ml/km yields a waste release factor of 1.4%, which was rounded upward to 2%. An uncertainty factor has not been applied to this value since the waste associated with industrial fuel use is expected to be less than the value obtained for this comprehensive analysis.

Morales, M. et al. (2015). Life cycle assessment of gasoline production and use in Chile. Science of the Total Environment 505, 833-843.

6.1.3. Exposure and risks for the environment and man via the environment

No exposure datasets are defined for this environmental contributing scenario.

Risk characterisation

Qualitative risk characterisation (Fresh water, Sediment (freshwater), Marine water, Sediment (marine water), Sewage Treatment Plant, Agricultural soil):

See Annex 4 for complete PETRORISK 8.1 modelling for environmental compartment.

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6.2. Cons CS 2: Fuels (PC 13)

6.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 50 %	TRA Consumers 3.1 (R15)
• Exposure via inhalation route: Yes	TRA Consumers 3.1 (R15)
• Spray: No	TRA Consumers 3.1 (R15)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Amount of product used per application: <= 4.23E4 g/event <i>est. fuel tank size 50 L converted using gasoline density of 845 kg/m³</i>	TRA Consumers 3.1 (R15)
• Exposure time per event: = 0.05 h/event <i>Consistent with reported refuelling time ranging from 0.3-3.5 min, with an average of 1 min.</i>	TRA Consumers 3.1 (R15)
• Frequency of use over a year: Frequent <i>52 times/year - once/week; consistent with the 90th percentile of 5 times per month (0.17) and average of 3.1 times per month (0.1); corresponds to "frequent" Use Freq band in ECETOC TRA v3.1</i>	TRA Consumers 3.1 (R15)
• Frequency of use over a day: = 1 events per day	TRA Consumers 3.1 (R15)
Information and behavioral advice for consumers	
• Place of use: Outdoor	TRA Consumers 3.1 (R15)
Other conditions affecting consumers exposure	
• Inhalation transfer factor: = 2E-3 <i>Refuelling via contained nozzle. Leakage on nozzle insertion and withdrawal is expected to be very low. As diesel fuel has a higher boiling point and let much lower vapour pressure than gasoline, emissions are expected to be much less significant than those for gasoline (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org).</i>	TRA Consumers 3.1 (R15)

6.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.66. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.07 mg/m ³ (EGRET 2) Supportive exposure (not used for RC): 376 mg/m ³ (TRA Consumers)	RCR < 0.01
Dermal, systemic, long term	0.15 mg/kg bw/day (EGRET 2) Supportive exposure (not used for RC): 0.087 mg/kg bw/day (TRA Consumers)	RCR = 0.12
Oral, systemic, long term	0 mg/kg bw/day (EGRET 2) Supportive exposure (not used for RC): 0 mg/kg bw/day (TRA Consumers)	RCR < 0.01

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Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.123

Remarks on exposure dataset obtained with ECETOC TRA

Additional conditions of use related to the exposure estimate:

- k) • **Exposure via dermal route: Yes**
- l) • **Exposure via oral route: Oral exposure is considered to be not relevant**
- m) • **Adult/child assumed: Adult**
- n) • **Body parts potentially exposed: Palm of one hand**
- o) • **Dermal transfer factor: = 5E-3**

(This value is greater (more conservative) than the <0.001% of material handled that has been measured as being transferred onto the skin when refuelling cars with diesel (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org). Rationale for skin contact area: only one hand holds the fuel nozzle when refuelling.)

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute):

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute): Avoid direct contact with product. Wash off any skin contamination immediately. Use in a well ventilated area. Do not ingest products

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Exposure scenario for EC 700-571-2

Identified Use	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
1 - Use in fuel; industrial	Industrial	-	-	1, 2, 8a, 8b, 16, 28	7	ESVOC SpERC 7.12a.v1
2 - Use in fuel; professional	Professional	-	-	1, 2, 8a, 8b, 16, 28	9a, 9b	ESVOC SpERC 9.12b.v1
3 - Use in fuel; consumer	Consumer	-	13	-	9a, 9b	ESVOC SpERC 9.12c.v1

1. Industrial; Use as a fuel - industrial

1.1. Title section

Environment		Use descriptors
Gen06	General measures applicable to all activities	ERC7, ESVOC SPERC 7.12a.v1

Worker		Use descriptors
CS14	Bulk transfers	PROC8b
CS45	Filling / preparation of equipment from drums or containers.	PROC8b
CS167	Refuelling	PROC8b
CS15	General exposures (closed systems) + Continuous process	PROC1
CS15	General exposures (closed systems) + Continuous process	PROC2
CS15	General exposures (closed systems)	PROC16
CS2	Process sampling	PROC3
CS36	Laboratory activities	PROC15
CS39	Equipment cleaning and maintenance	PROC8a
CS103	Vessel and container cleaning	PROC8a
CS67	Storage	PROC2

Processes, tasks, activities covered	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.
Assessment method	See Section 3.

1.2 Conditions of use affecting exposure

1.2.1 Control of environmental exposure: General measures applicable to all activities (ERC7, ESVOC SPERC 7.12a.v1)

ERC7	Use of functional fluid at industrial site
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)
Assessment method	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. A quantitative exposure assessment (RCR) was performed for the potential formation of aerosols for all scenarios. The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrорisk model.

Product (article) characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP

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Concentration of substance in product	(unless otherwise stated)
	100 %
Vapour pressure	0.871 hPa

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage (tonnes/year):	45700
Regional use tonnage (tonnes/year):	457000
Fraction of Regional tonnage used locally:	1 %
Maximum daily site tonnage (kg/day):	150000
Emission Days (days/year):	300
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Treat air emission to provide a typical removal efficiency of:	95 %
Provide onsite wastewater removal efficiency of 3 (%):	≥ 92.5 %
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Bund storage facilities to prevent soil and water pollution in the event of spillage	

Conditions and measures related to personal protection, hygiene and health evaluation	
<p>The implementation of relevant RMMS will ensure that the likelihood of an event occurring due to the aspiration hazard of the substance is negligible and the risk is considered to be controlled to a level of no concern.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p> <p>Workers:</p> <ul style="list-style-type: none"> - Do not ingest - Implement basic standard of occupation hygiene - Avoid splashes and spills - Avoid contact with contaminated objects and tools <ul style="list-style-type: none"> - Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed. - Training for staff on good practices - Good standard of personal hygiene <p>Consumers:</p> <ul style="list-style-type: none"> - Do not ingest 	General measures applicable to all activities

Conditions and measures related to sewage treatment plant	
Assumed domestic sewage treatment plant flow:	2000 m ³ /d
Estimated substance removal from wastewater via domestic sewage treatment:	92.5 %

Conditions and measures related to treatment of waste (including article waste)	
Dispose of waste in accordance with environmental legislation.	
Dispose of waste in accordance with environmental legislation.	

Other conditions affecting environmental exposure	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100

1.2.2. Control of worker exposure: Bulk transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

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Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Transfer via enclosed lines	
Clear transfer lines prior to de-coupling	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Outdoor	
(closed systems)	

1.2.3. Control of worker exposure: Filling / preparation of equipment from drums or containers. (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Use drum pumps or carefully pour from container	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor	

1.2.4. Control of worker exposure: Refuelling (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Use drum pumps or carefully pour from container	
Use vapour recovery units when necessary	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

1.2.5. Control of worker exposure: General exposures (closed systems) + Continuous process (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
-------	--

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures	
Ensure samples are obtained under containment or extract ventilation	

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	
Ensure material transfers are under containment or extract ventilation	
Wear suitable gloves tested to EN374.	

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Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor	

1.2.6. Control of worker exposure: General exposures (closed systems) + Continuous process (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
-------	--

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures		
Ensure samples are obtained under containment or extract ventilation		

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	
Ensure material transfers are under containment or extract ventilation	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor	
with sample collection	

1.2.7. Control of worker exposure: General exposures (closed systems) (PROC16)

PROC16	Use of fuels
--------	--------------

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures		
Ensure samples are obtained under containment or extract ventilation		

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor	

1.2.8. Control of worker exposure: Process sampling (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	≤ 1 h/day

Technical and organisational conditions and measures		
Ensure samples are obtained under containment or extract ventilation		

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	

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Wear suitable gloves tested to EN374.	
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Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

1.2.9. Control of worker exposure: Laboratory activities (PROC15)

PROC15	Use as laboratory reagent
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
With LEV	
Handle in a fume cupboard or under extract ventilation	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor	

1.2.10. Control of worker exposure: Equipment cleaning and maintenance (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Drain down and flush system prior to equipment break-in or maintenance	
Retain drain downs in sealed storage pending disposal or for subsequent recycle	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

1.2.11. Control of worker exposure: Vessel and container cleaning (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day
Infrequent	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	
Wear suitable coveralls to prevent exposure to the skin	
Drain down and flush system prior to equipment break-in or maintenance	
Retain drain downs in sealed storage pending disposal or for subsequent recycle	
Provide enhanced general ventilation by mechanical means	
If above technical/organisational control measures are not feasible, then adopt following PPE:	
Wear positive pressure air supplied respirator if required by safe entry procedures	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

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1.2.12. Control of worker exposure: Storage (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
-------	--

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Store substance within a closed system	
Transfer via enclosed lines	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure General measures applicable to all activities (ERC7, ESVOC SPERC 7.12a.v1)

Information for contributing exposure scenario		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated, The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.		
Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	0.00025	
Release fraction to wastewater from process (initial release prior to RMM):	0.000001	
Release fraction to soil from process (initial release prior to RMM):	0	

1.3.2. Worker exposure Bulk transfers (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.466	

1.3.3. Worker exposure Filling / preparation of equipment from drums or containers. (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.466	

1.3.4. Worker exposure Refuelling (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.

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Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.466	

1.3.5. Worker exposure General exposures (closed systems) + Continuous process (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.03 mg/kg bw/day	0.001	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.01 ppm	0.001	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.002	

1.3.6. Worker exposure General exposures (closed systems) + Continuous process (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.033	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.1 ppm	0.006	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.039	

1.3.7. Worker exposure General exposures (closed systems) (PROC16)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.008	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.1 ppm	0.006	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.014	

1.3.8. Worker exposure Process sampling (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.008	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	3 ppm	0.182	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.19	

1.3.9. Worker exposure Laboratory activities (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.008	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.5 ppm	0.03	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.038	

1.3.10. Worker exposure Equipment cleaning and maintenance (PROC8a)

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Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	13.71 mg/kg bw/day	0.326	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	1 ppm	0.061	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.387	

1.3.11. Worker exposure Vessel and container cleaning (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	13.71 mg/kg bw/day	0.326	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	1 ppm	0.061	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.387	

1.3.12. Worker exposure Storage (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.033	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	1 ppm	0.061	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.094	

1.4. Guidance to Downstream User (DU) to evaluate whether he works inside the boundaries set by the ES

1.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: 92.5%
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1.4.2. Health

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Guidance - Health	<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation. The risk phrase H304 (May be fatal if swallowed and enters airways) refers to the possibility of inhalation, a risk not quantifiable determined by the physico-chemical properties (i.e. viscosity) that may occur during ingestion and Even in the case of vomiting after ingestion. A DNEL can not be derived. Risks from physicochemical hazards of substances can be controlled by implementing risk management measures. For substances classified as H304, the following measures must be taken to control the risk of inhalation.</p> <p>EXPOSURE SCENARIOS</p> <p>All exposure scenarios for this substance did not require a quantitative assessment of exposure, but only a qualitative one.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p> <p>Workers:</p> <ul style="list-style-type: none">- Do not ingest- Implement basic standard of occupation hygiene- Avoid splashes and spills- Avoid contact with contaminated objects and tools- Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed.- Training for staff on good practices- Good standard of personal hygiene <p>Consumers:</p> <ul style="list-style-type: none">- Do not ingest
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2. Professional; Use as a fuel - Professional

2.1. Title section

Environment		Use descriptors
Gen07	General measures applicable to all activities	ERC8b, ERC8e, ESVO SPERC 9.12b.v1

Worker		Use descriptors
CS14	Bulk transfers	PROC8b
CS45	Filling / preparation of equipment from drums or containers.	PROC8b
CS167	Refuelling	PROC8b
CS15	General exposures (closed systems)	PROC1
CS15	General exposures (closed systems)	PROC2
CS15	General exposures (closed systems)	PROC16
CS39	Equipment cleaning and maintenance	PROC8a
CS103	Vessel and container cleaning	PROC8a
CS67	Storage	PROC1
CS67	Storage	PROC2

Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Assessment method	See Section 3.

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: General measures applicable to all activities (ERC8b, ERC8e, ESVO SPERC 9.12b.v1)

ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
ESVO SPERC 9.12b.v1	Use as a fuel: Professional (SU 22)
Assessment method	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. A quantitative exposure assessment (RCR) was performed for the potential formation of aerosols for all scenarios. The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Product (article) characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product	(unless otherwise stated) 100 %
Vapour pressure	0.871 hPa

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage (tonnes/year):	4.45
Regional use tonnage (tonnes/year):	89000
Fraction of Regional tonnage used locally:	0.0005 %
Maximum daily site tonnage (kg/day):	120
Emission Days (days/year):	365
Covers daily exposures up to 8 hours (unless stated differently)	

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Conditions and measures related to personal protection, hygiene and health evaluation	
General measures applicable to all activities	
<p>The implementation of relevant RMMs will ensure that the likelihood of an event occurring due to the aspiration hazard of the substance is negligible and the risk is considered to be controlled to a level of no concern.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p>	<p>Workers:</p> <ul style="list-style-type: none"> - Do not ingest - Implement basic standard of occupation hygiene - Avoid splashes and spills - Avoid contact with contaminated objects and tools <p>Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed.</p> <ul style="list-style-type: none"> - Training for staff on good practices - Good standard of personal hygiene <p>Consumers:</p> <ul style="list-style-type: none"> - Do not ingest

Conditions and measures related to sewage treatment plant	
Assumed domestic sewage treatment plant flow:	2000 m ³ /d
Estimated substance removal from wastewater via domestic sewage treatment:	92.5 %

Conditions and measures related to treatment of waste (including article waste)	
Dispose of waste in accordance with environmental legislation.	
Dispose of waste in accordance with environmental legislation.	

Other conditions affecting environmental exposure	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100

2.2.2. Control of worker exposure: Bulk transfers (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Ensure operation is undertaken outdoors	
Transfer via enclosed lines	
Clear transfer lines prior to de-coupling	
Handle substance within a closed system	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Outdoor	
Heating oil and diesel deliveries	

2.2.3. Control of worker exposure: Filling / preparation of equipment from drums or containers. (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
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Without LEV	
Use drum pumps or carefully pour from container	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.4. Control of worker exposure: Refuelling (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Use drum pumps or carefully pour from container	
Use vapour recovery units when necessary	
Wear suitable gloves tested to EN374.	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.5. Control of worker exposure: General exposures (closed systems) (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
-------	--

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures	
Ensure samples are obtained under containment or extract ventilation	

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	
Handle substance within a closed system	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.6. Control of worker exposure: General exposures (closed systems) (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
-------	--

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures	
Ensure samples are obtained under containment or extract ventilation	

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	

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Handle substance within a predominantly closed system provided with extract ventilation	
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Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	
with sample collection	

2.2.7. Control of worker exposure: General exposures (closed systems) (PROC16)

PROC16	Use of fuels
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Technical and organisational conditions and measures	
Ensure samples are obtained under containment or extract ventilation	

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
enclosed equipment	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.8. Control of worker exposure: Equipment cleaning and maintenance (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
--------	---

Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Drain down and flush system prior to equipment break-in or maintenance	
Wear suitable gloves tested to EN374.	
Retain drain downs in sealed storage pending disposal or for subsequent recycle	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.9. Control of worker exposure: Vessel and container cleaning (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Drain down and flush system prior to equipment break-in or maintenance	
Retain drain downs in sealed storage pending disposal or for subsequent recycle	
Provide enhanced general ventilation by mechanical means	
If above technical/organisational control measures are not feasible, then adopt following PPE:	
Wear positive pressure air supplied respirator if required by safe entry procedures	
Wear suitable gloves tested to EN374.	
Wear suitable coveralls to prevent exposure to the skin	

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Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	

Indoor/Outdoor use.	
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2.2.1. Control of worker exposure: Storage (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Store substance within a closed system	
Transfer via enclosed lines	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.2.11. Control of worker exposure: Storage (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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Amount used (or contained in articles), frequency and duration of use/exposure	
Exposure duration	> 4 h/day

Conditions and measures related to personal protection, hygiene and health evaluation	
Without LEV	
Store substance within a closed system	
Transfer via enclosed lines	

Other conditions affecting workers exposure	
Assumes activities are at ambient temperature (unless stated differently)	
Indoor/Outdoor use.	

2.3 Exposure estimation and reference to its source

2.3.1. Environmental release and exposure General measures applicable to all activities (ERC8b, ERC8e, ESVO SPERC 9.12b.v1)

Information for contributing exposure scenario		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated, The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.		
Release route	Release rate	Release estimation method
Release fraction to air from process (initial release prior to RMM):	0.0001	
Release fraction to wastewater from process (initial release prior to RMM):	0.00001	
Release fraction to soil from process (initial release prior to RMM):	0.00001	

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2.3.2. Worker exposure Bulk transfers (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.7 ppm	0.042	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.205	

2.3.3. Worker exposure Filling / preparation of equipment from drums or containers. (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	10 ppm	0.606	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.769	

2.3.4. Worker exposure Refuelling (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.163	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	10 ppm	0.606	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.769	

2.3.5. Worker exposure General exposures (closed systems) (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.03 mg/kg bw/day	0.001	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.01 ppm	0.001	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.002	

2.3.6. Worker exposure General exposures (closed systems) (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.033	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	1 ppm	0.061	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.094	

2.3.7. Worker exposure General exposures (closed systems) (PROC16)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.008	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.14 ppm	0.008	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.016	

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2.3.8. Worker exposure Equipment cleaning and maintenance (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	13.71 mg/kg bw/day	0.326	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.629	

2.3.9. Worker exposure Vessel and container cleaning (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	1.371 mg/kg bw/day	0.033	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.336	

2.3.10. Worker exposure Storage (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.03 mg/kg bw/day	0.001	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.01 ppm	0.001	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.002	

2.3.11. Worker exposure Storage (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.008	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	5 ppm	0.303	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.311	

2.4. Guidance to Downstream User (DU) to evaluate whether he works inside the boundaries set by the ES

2.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: 92.5%
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2.4.2. Health

Guidance - Health	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation. The risk phrase H304 (May be fatal if swallowed and enters airways) refers to the possibility of inhalation, a risk not quantifiable determined by the physico-chemical properties (i.e. viscosity) that may occur during ingestion and Even in the case of vomiting after ingestion. A DNEL can not be derived. Risks from physicochemical hazards of substances can be controlled by implementing risk management measures. For substances
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	<p>classified as H304, the following measures must be taken to control the risk of inhalation.</p> <p>EXPOSURE SCENARIOS</p> <p>All exposure scenarios for this substance did not require a quantitative assessment of exposure, but only a qualitative one.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p> <p>Workers:</p> <ul style="list-style-type: none"> - Do not ingest - Implement basic standard of occupation hygiene - Avoid splashes and spills - Avoid contact with contaminated objects and tools <ul style="list-style-type: none"> - Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed. - Training for staff on good practices - Good standard of personal hygiene <p>Consumers:</p> <ul style="list-style-type: none"> - Do not ingest
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3. - Consumer; Use as a fuel (consumer)

3.1. Title section

Consumer		Use descriptors
Gen08	General measures	PC13, ERC8b, ERC8e, ESVOC SPERC 9.12c.v1
Cons01	Fuels (liquid): Automotive Refuelling	PC13
Cons02	Fuels (liquid): Garden Equipment - Use	PC13
Cons03	Fuels (liquid): Garden Equipment - Refueling	PC13
Cons04	Liquid: Lamp oil	PC13
Cons05	Liquid: Home space heater fuel	PC13

Processes, tasks, activities covered	Covers consumer uses in liquid fuels
Assessment method	See Section 3.

3.2. Conditions of use affecting exposure

3.2.1. Control of consumer exposure: General measures (PC13, ERC8b, ERC8e, ESVOC SPERC 9.12c.v1)

PC13	Fuels
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
ESVOC SPERC 9.12c.v1	Use as a fuel: Consumer (SU21)

Product (article) characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product	(unless otherwise stated) ≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Regional use tonnage (tonnes/year):	55700 t/yr
Fraction of Regional tonnage used locally:	0.0005
Annual site tonnage (tonnes/year):	2.79 t/yr
Maximum daily site tonnage (kg/day):	7.6 kg/day
Emission Days (days/year):	365 days/yr

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Measures related to information and behavioural advice to consumers including personal protection and hygiene	
<p>The implementation of relevant RMMS will ensure that the likelihood of an event occurring due to the aspiration hazard of the substance is negligible and the risk is considered to be controlled to a level of no concern.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p>	<p>Workers:</p> <ul style="list-style-type: none"> - Do not ingest - Implement basic standard of occupation hygiene - Avoid splashes and spills - Avoid contact with contaminated objects and tools <p>Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed.</p> <ul style="list-style-type: none"> - Training for staff on good practices - Good standard of personal hygiene <p>Consumers: Do not ingest</p>

Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers exposure up to (hours/event):	2
Assumes use at ambient temperature	
Covers use in room size of (m3):	20 m ³
Ensure good ventilation.	

3.2.2. Control of consumer exposure: Fuels (liquid): Automotive Refuelling (PC13)

PC13	Fuels
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Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers use up to (days/year):	52
Covers use up to (times/day of use):	1
Covers skin contact area up to (cm2):	210 cm ²
For each use event, covers use amounts up to (g):	38600
Covers use in room size of (m3):	100 m ³
Covers exposure up to (hours/event):	0.05
Covers outdoor use.	

3.2.3. Control of consumer exposure: Fuels (liquid): Garden Equipment - Use (PC13)

PC13	Fuels
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Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers use up to (days/year):	26
Covers use up to (times/day of use):	1
For each use event, covers use amounts up to (g):	772
Covers use in room size of (m3):	100 m ³
Covers exposure up to (hours/event):	2
Covers outdoor use.	

3.2.4. Control of consumer exposure: Fuels (liquid): Garden Equipment - Refueling (PC13)

PC13	Fuels
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Specific operational conditions	
Unless otherwise stated:	
Covers concentrations up to (%):	1 %
Covers use up to (days/year):	26 days/yr
Covers use up to (times/day of use):	1
Covers skin contact area up to (cm2):	420 cm ²
For each use event, covers use amounts up to (g):	750 g
Covers use in a one car garage (34 m3) under typical ventilation.	
Covers use in room size of (m3):	34
Covers exposure up to (hours/event):	0.03 hours/event

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Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers use up to (days/year):	26
Covers use up to (times/day of use):	1
Covers skin contact area up to (cm ²):	420 cm ²
For each use event, covers use amounts up to (g):	772
Covers use in a one car garage (34 m ³) under typical ventilation.	
Ensure good ventilation.	
Covers use in room size of (m ³):	34 m ³
Covers exposure up to (hours/event):	0.03

3.2.5. Control of consumer exposure: Liquid: Lamp oil (PC13)

PC13	Fuels
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Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers use up to (days/year):	52
Covers use up to (times/day of use):	1
Covers skin contact area up to (cm ²):	210 cm ²
For each use event, covers use amounts up to (g):	100
Covers use in room size of (m ³):	20 m ³
Covers exposure up to (hours/event):	0.01

3.2.6. Control of consumer exposure: Liquid: Home space heater fuel (PC13)

PC13	Fuels
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Other conditions affecting consumer exposure	
Unless otherwise stated:	
Covers concentrations up to (%):	100 %
Covers use up to (days/year):	365
Covers use up to (times/day of use):	1
Covers skin contact area up to (cm ²):	210 cm ²
For each use event, covers use amounts up to (g):	1500
Covers use in room size of (m ³):	20 m ³
Covers exposure up to (hours/event):	0.03

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3.3. Exposure estimation and reference to its source

3.3.1. Consumer exposure General measures (PC13, ERC8b, ERC8e, ESVOC SPERC 9.12c.v1)

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

3.3.2. Consumer exposure Fuels (liquid): Automotive Refuelling (PC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Oral - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.
Dermal - Long-term - systemic effects	4 mg/kg bodyweight/day	0.222	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.227 mg/m ³	0.002	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.224	

3.3.3. Consumer exposure Fuels (liquid): Garden Equipment - Use (PC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Oral - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.
Dermal - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.524 mg/m ³	0.006	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.006	

3.3.4. Consumer exposure Fuels (liquid): Garden Equipment - Refueling (PC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Oral - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.
Dermal - Long-term - systemic effects	3.92 mg/kg bodyweight/day	0.218	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.058 mg/m ³	0.001	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.219	

3.3.5. Consumer exposure Liquid: Lamp oil (PC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Oral - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.
Dermal - Long-term - systemic effects	4 mg/kg bodyweight/day	0.222	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	0.019 mg/m ³	0	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.222	

3.3.6. Consumer exposure Liquid: Home space heater fuel (PC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	Exposure estimate	RCR	Method
Oral - Long-term - systemic effects	0 mg/kg bodyweight/day	0	Used ECETOC TRA model.

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Dermal - Long-term - systemic effects	2.8 mg/kg bodyweight/day	0.156	Used ECETOC TRA model.
Inhalation - Long-term - systemic effects	1.858 mg/m ³	0.02	Used ECETOC TRA model.
Sum RCR - Long-term - systemic effects		0.176	

3.4. Guidance to Downstream User (DU) to evaluate whether he works inside the boundaries set by the ES

3.4.1. Environment

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

Guidance - Health	<p>EXPOSURE SCENARIOS</p> <p>All exposure scenarios for this substance did not require a quantitative assessment of exposure, but only a qualitative one.</p> <p>Considering the specific hazard properties (H304), the implementation of the relevant risk reduction measures ensures that the possibility of the event connected to the hazard of aspiration is negligible, and risk can be assumed as controlled.</p> <p>Workers: Do not ingest Implement basic standard of occupation hygiene Avoid splashes and spills Avoid contact with contaminated objects and tools Management/supervision actions to check that the Risk Reduction Measures in place are being used correctly and Operating Conditions are followed. Training for staff on good practices Good standard of personal hygiene</p> <p>Consumers: Do not ingest</p>
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