

SAFETY DATA SHEET

UPM BIOVERNO NAPHTHA

Date: 3rd April 2019

Previous date: 1st January 2019



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

1.1 Product identifier

Commercial Product Name: UPM BIOVERNO NAPHTHA
Chemical name: Renewable hydrocarbons of wood origin (naphtha type fraction)
EC number: 700-918-8
CAS number: not assigned
REACH registration number: 01-2120052681-60-0000

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

Recommended use: Distribution, formulation and use as intermediate
Use as a fuel and in coatings
Uses Advised Against: Only the uses covered by the exposure scenarios are recommended (see annex)

1.3 Details of the supplier of the safety data sheet

Supplier: UPM-Kymmene Oyj
Street address: Alvar Aallon katu 1
Postcode and post office: PO Box 380, FI-00101 Helsinki
Country: Finland

Telephone: +358 204 15 111

Email: msds@upm.com

1.4 Emergency telephone number

Telephone number, name and address:
See section 16.6 for the list of telephone numbers of poison centres in the European Economic Area.
Poison Centre, Tukholmankatu 17, PL 790, 00029 HUS (Helsinki), (24h)/+358 (0)9 4711, direct number +358 (0)9 471977

SECTION 2. HAZARDS IDENTIFICATION

This substance is classified as hazardous in accordance with the CLP regulation 1272/2008 and the Directive 67/548/EEC. This substance may cause genetic defects and cancer. It is suspected of damaging fertility or the unborn child. It may be fatal if swallowed and it may cause skin irritation if contact on skin. This substance is toxic to aquatic life with long lasting effects.

2.1 Classification of the substance or mixture

1272/2008 (CLP):

Flam. Liquid 2	H225
Skin Irrit. 2	H315
Asp. Tox. 1	H304
Repr. 2	H361
Muta. 1B	H340
Carc. 1B	H350
STOT Single Exp. 3	H336
Aquatic Chronic 2	H411

2.2 Label elements

1272/2008 (CLP) GHS02 GHS07 GHS08 GHS09

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Signal word:

Danger

Hazard Statements:

H225	Highly flammable liquid and vapour
H315	Causes skin irritation
H304	May be fatal if swallowed and enters airways
H361	Suspected of damaging fertility or the unborn child via oral and inhalation exposure routes
H340	May cause genetic defects via oral and inhalation exposure routes
H350	May cause cancer
H336	May cause drowsiness or dizziness via inhalation route
H411	Toxic to aquatic life with long lasting effects

Precautionary Statements:

P210	Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P331	Do NOT induce vomiting.
P501	Dispose of contents/container to... (according to local waste management regulations)

Note P:

The classification as a carcinogen or mutagen need not to apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301 +P310-P331 (Table 3.1) or the S-phrases (2-)23-24-62 (Table 3.2) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI.

2.3 Other hazards

The criteria for PBT and vPvB are not met and this substance is not hazardous to ozone layer.

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SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

This substance is an UVCB substance and predominantly rich in saturated hydrocarbons with a carbon number range from C6 to C10.

EC number:	CAS number:	Chemical name of the substance:	Concentration:		Classification:
700-918-8	-	Renewable hydrocarbons of wood origin (naphtha type fraction)	100 %	(w/w)	1272/2008 (CLP): Flam. Liquid 2 H225 Skin Irrit. 2 H315 Asp. Tox. 1 H304 Repr. 2H361 Muta. 1B H340 Carc. 1B H350 STOT Single Exp. 3 H335 Aquatic Chronic 2 H411

3.3 Other information

This substance is predominantly rich in saturated hydrocarbons with a carbon number range from C6 to C10. The substance contains benzene $\geq 0.1 - < 1.0$ % (w/w), toluene $\geq 0.0 - < 5.0$ % (w/w) and n-hexane $\geq 0.0 - < 5.0$ % (w/w).

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation:	Remove the affected person to fresh air. If breathing has stopped, administer artificial respiration. Give cardiac massage if necessary. If the affected person is breathing but unconscious, place in recovery position. Obtain medical assistance immediately.
Skin contact:	Flush the contaminated skin with water. Use soap if available. Contaminated clothing should be soaked with water, removed, and laundered before reuse. If skin irritation persists, consult a physician.
Eye contact:	Rinse immediately with plenty of water, also under the eyelids. Continue irrigation for several minutes while moving eyes to extreme positions. Consult a physician.
Ingestion:	DO NOT INDUCE VOMITING. Obtain medical assistance immediately (risk of aspiration into the lungs especially if nausea or irritation occurs). If vomiting occurs, help to keep the victim's head down so that aspiration to the lungs will not occur.

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4.2 Most important symptoms and effects, both acute and delayed

Irritating to skin. Aspiration into the lungs may be fatal. Over-exposure leads to drowsiness, dizziness and finally to narcosis.

4.3 Indication of immediate medical attention and special treatment needed

Show this safety data sheet to the doctor in attendance. Treat symptomatically.

SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Large fires: Foam, dry chemical.
Small fires: Carbon dioxide, sand, earth.

Extinguishing media which must not be used for safety reasons: Water.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance: Highly flammable liquid and vapour. Explosion risk if product tanks and containers are subjected to fire. The product floats and may reignite on water. Electrostatic charges may be generated during pumping process.

Hazardous combustion products: A complex mixture of airborne solids, liquids and gases, including carbon monoxide, sulphur oxides and other organic and inorganic compounds will be evolved when this material undergoes combustion

5.3 Advice for fire-fighters

Special precautions for fire-fighters: Keep containers cool with water spray remotely due to the risk of explosion.

Special protective equipment for fire-fighters: A self-contained breathing apparatus and suitable protective clothing should be worn in fire conditions.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Avoid inhalation of vapour and contact with skin. Evacuate people upwind from the spill area. Remove all ignition sources. Stop the leak if it can be done safely. Use appropriate personal protection equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. Use non-sparking tools.

6.2 Environmental precautions

Prevent entry into municipal sewers, soil and waterways. If the product contaminates soil, watercourses or drainage systems, inform the local authorities.

6.3 Methods and materials for containment and cleaning up

Immediately start clean-up of the liquid and contaminated soil. Pay attention to the fire and health hazards caused by the product. Small volumes can be absorbed with inert materials (e.g. sand, diatomaceous earth, commercial absorbent) and collect in suitable labelled containers to be disposed of in accordance with local regulations. Large volumes should be pumped into containers. Ensure adequate ventilation.

6.4 Reference to other sections

See also section 8 and exposure scenarios in Annexes.

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Date: 3rd April 2019Previous date: 1st January 2019**SECTION 7. HANDLING AND STORAGE****7.1 Precautions for safe handling**

Keep away from sources of ignition. Take precautionary measures (e.g. earthing) against static discharges. Handle the product in closed systems or provide sufficient ventilation to keep the air concentrations under the explosion limits. Avoid skin contact and inhalation of oil mist. Wear protective equipment when needed (see point 8.2.). Thoroughly clean contaminated skin and change dirty clothing and equipment. It is prohibited to eat, drink and smoke during the product handling. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).

7.2 Conditions for safe storage, including any incompatibilities

Store in tightly sealed, appropriately labelled containers which are impermeable to the product. Store in containers and areas suitable for the storage of combustible liquids. Take precautionary measures to prevent product spills into municipal sewers, soil or water courses.

7.3 Specific end use(s)

The exposure scenarios for identified industrial and professional uses are presented in the Annexes of this SDS.

List of Exposure Scenarios:

- | | |
|------|--|
| ES 1 | Distribution ,use as an intermediate and formulation & (re)packing of renewable naphtha and mixtures (containing 0% to 1% benzene) |
| ES 2 | Industrial uses of renewable naphtha in coatings (containing 0% to 1% benzene) |
| ES 3 | Industrial use of renewable naphtha as a fuel (containing 0% to 1% benzene) |
| ES 4 | Professional use of renewable naphtha as a fuel (containing 0% to 1% benzene) |

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION**8.1 Control parameters**

Occupational exposure limits (OELs) for the critical components in the renewable naphtha (benzene, n-hexane and toluene)

Country	15-min TWA ppm (mg/m ³)			8-hour TWA ppm (mg/m ³)		
	n-Hexane	Toluene	Benzene	n-Hexane	Toluene	Benzene
EU				20 (72)		1 (3.25)
Finland		100 (380)			25 (81)	
Belgium					50 (191)	
Denmark					25 (95)	
United Kingdom		150 (560)			50 (190)	
Germany		950 ⁽¹⁾			50 (190)	
US			5	50 (176)	50 (190)	1 (3.2)

⁽¹⁾ 30-min TWA

DNELs

The critical DNELs for workers: **Inhalation-systemic-long-term effects:** DMEL (Derived Minimum Effect Level) = 3.25 mg/m³. DMEL value is based on the Binding Occupational Exposure Limit value (BOELV) for benzene, the most hazardous constituent in the substance. BOELV can be used in place of a formal DN(M)EL provided no new scientific information exists which challenges the validity of the BOELV.

The critical DNELs for consumers:

Dermal-systemic-long-term effects: DMEL (Derived Minimum Effect Level): 234 mg/kg bw/day. The dermal DMEL is extrapolated from the BOELV for benzene (3.25 mg/m³).

Dermal-local-long-term effects: Low hazard is assigned as the substance is classified for as skin irritant. The appropriate RMMs are in use to avoid skin contact (See section 8.2 and Annex).

Inhalation-systemic-long-term effects: DMEL (Derived Minimum Effect Level) = 3.25 µg/m³ is based on the carcinogenicity risk caused by the most hazardous component i.e. benzene. .

Dermal-systemic-long-term effects: DMEL (Derived Minimum Effect Level): 234 µg/kg bw/day. The dermal DMEL is extrapolated from the inhalation DMEL for benzene (3.25 µg/m³).

Oral-systemic-long-term effects: DMEL (Derived Minimum Effect Level): 0.234 µg/kg bw/day. The oral DMEL is extrapolated from the inhalation DMEL for benzene (3.25 µg/m³).

PNECs

PNEC (freshwater and marine water): The overall range (all representative components of the substance) for the PNEC(aqueous) values estimated with the PETRORISK tool are from 0.88 µg/L to 2100 µg/L.

PNEC (sediment freshwater and marine water): The overall range (all representative components of the substance) for the PNEC(sediment) values estimated with the PETRORISK tool are from 0.33 mg/kg ww to 6.7 mg/kg ww.

PNEC (sewage treatment plant): The overall range (all representative components of the substance) for the PNEC(wastewater) values estimated with the PETRORISK tool are from 13 µg/L to 34 000 µg/L.

PNEC (soil): The overall range (all representative components of the substance) for the PNEC(soil) values estimated with the PETRORISK tool are from 0.13 mg/kg ww to 2.7 mg/kg ww.

8.2 Exposure controls

Appropriate engineering controls: Provide good general ventilation (3-5 air changes per hour).
Provide local exhaust ventilation for points of potential exposure (see annexes).

Individual protection measures: Respiratory protection
Use substance/task appropriate respirator with filter type ABEKP3.
Hand protection
Use chemical resistant gloves (EN374).
Eye/face protection
Wear face shield or chemical goggles (EN166).
Skin protection
Full skin coverage with appropriate light-weight barrier material.

Environmental exposure controls:

Good hygiene and housekeeping. Avoid release to the environment. Treat waste water and air emissions in a proper way. All residues of the substance should be treated as hazardous waste (see annexes).

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Important Health Safety and Environmental Information

Appearance:	Colourless, bright and clear liquid
Odour:	A typical hydrocarbon odour
Odour threshold:	No data available
pH:	No data available
Melting point/freezing point:	< -50 °C at 101.3 kPa (pour point, DIN ISO 3016)
Initial boiling point and boiling range:	40 -190 °C (typical at 101.3 kPa (EN ISO 3405)
Flash point:	10 °C (ASTM D93 closed cup)
Evaporation rate:	Not known
Flammability (solid, gas):	Highly flammable
<u>Explosive properties:</u>	Non explosive (EU A.14) Lower explosion limit: No information available Upper explosion limit: No information available
Vapour pressure:	typical 35 kPa at 38 °C (DIN EN 13016-1)
Vapour density:	Not known
Density:	720-775 kg/m ³ at 15°C (EN ISO12185)
<u>Solubility(ies):</u>	Water solubility 18 mg/L at 25 °C(partly soluble) Fat solubility: No information available
Partition coefficient: n-octanol/water:	Log Kow 4.7 at 22 °C (EU A.8)
Auto-ignition temperature:	> 240 °C (EU A.15)
Decomposition temperature:	Not known
Viscosity:	Kinematic viscosity < 1 mm ² /s at 38 °C (DIN EN ISO 3104)
Explosive properties	Non explosive (EU A.14)
Oxidising properties:	Not oxidising

9.2 Other information:

Adsorption coefficient (log Koc)	The overall range (all components) for the estimated log Koc values are from 1.83 to 5.20 (PETRORISK modelling)
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SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

Not reactive under normal use and storage conditions.

10.2 Chemical stability

Chemically stable under normal storage conditions.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use hazardous reactions will not occur.

10.4 Conditions to avoid

Keep away from ignition sources.

10.5 Incompatible materials

None known.

10.6 Hazardous decomposition products

None known. Thermal decomposition and burning may produce irritating or toxic fumes.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Basic toxicokinetics:	There are no experimental studies available and the assessment has been conducted qualitatively on the basis of the physical and chemical properties and the toxicokinetic information from the constituents of the substance.						
Absorption:	Occurs via oral and dermal routes. Absorption by the lung is also expected.						
Distribution:	Expected to distribute mainly to fat tissue.						
Metabolism:	Based on the available data aliphatic hydrocarbons and aromatic hydrocarbons are oxidised to various alcohol and carboxylic acid derivatives.						
Excretion	Based on the available data aliphatic and aromatic hydrocarbons and their metabolites are rapidly excreted, either exhaled from the lungs or excreted in the urine.						
Acute toxicity:	<table border="0"> <tr> <td>Oral:</td> <td>LD50 (rat) > 2000 mg/kg bw/day (OECD 420)</td> </tr> <tr> <td>Inhalation:</td> <td>LC50 (rat) 23400 mg/m³ (8-hour exposure; volatile constituent in the substance; nonane)</td> </tr> <tr> <td>Dermal:</td> <td>LD50 (rabbit) 2920 mg/kg bw/day (rabbits were exposed to similar UVCB substance)</td> </tr> </table>	Oral:	LD50 (rat) > 2000 mg/kg bw/day (OECD 420)	Inhalation:	LC50 (rat) 23400 mg/m ³ (8-hour exposure; volatile constituent in the substance; nonane)	Dermal:	LD50 (rabbit) 2920 mg/kg bw/day (rabbits were exposed to similar UVCB substance)
Oral:	LD50 (rat) > 2000 mg/kg bw/day (OECD 420)						
Inhalation:	LC50 (rat) 23400 mg/m ³ (8-hour exposure; volatile constituent in the substance; nonane)						
Dermal:	LD50 (rabbit) 2920 mg/kg bw/day (rabbits were exposed to similar UVCB substance)						
Skin irritation and corrosion:	The substance is irritating to skin based on the in vitro study (OECD 439)						
Serious eye damage/irritation	The substance is not Irritating to eyes based on the in vitro HCE study and animal study results on analogue substance fossil naphtha.						
Sensitisation:	Not sensitising based on the Guinea Pig Maximisation Test (GPMT) (OECD 406).						
Germ cell mutagenicity:	The substance was non-mutagenic in bacterial reverse mutagenicity test (OECD 471). Although this single study does not support the classification for mutagenicity, this substance is regarded as germ cell mutagen based on the benzene content in the substance.						
Carcinogenicity:	The substance is considered carcinogenic based on the benzene content.						
Reproductive toxicity:	This substance is suspected of damaging fertility and the unborn child based on the n-hexane and toluene content.						
STOT-single exposure:	Over-exposure to substance leads to dizziness and nausea and causes finally narcosis.						
STOT-repeated exposure:	The substance has not been classified for STOT-RE. This substance contains n-hexane, toluene and benzene which have harmonised classification for STOT-RE. However, based on the CLP mixtures rules no classification of this substance is warranted.						
Aspiration hazard:	Based on the kinematic viscosity the substance is classified for aspiration hazard.						

11.2 Other information:

No other adverse effects known.

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SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Aquatic toxicity: This substance is classified as hazardous to the aquatic environment (Aquatic chronic 2 H411)

Short-term toxicity:

Fish: 96-h LL50(mortality, *Oncorhynchus mykiss*): 10 mg/l (OECD 203); analogue substance fossil gasoline

Invertebrates: 48-h EL50(immobilisation; *Daphnia magna*) 7.6 mg/l (OECD 202) analogue substance fossil gasoline

Algae: 72-h EL50 (growth rate; *Desmodesmus subspicatus*) > 100 mg/l (OECD 201)

Toxicity to other organisms:

Toxicity to activated sludge respiration: EL10 (3h): 34.78 mg/l (OECD 209)

12.2 Persistence and degradability

Biodegradation- % 77 after 28 days. (OECD 301F Ready Biodegradability Manometric Respirometry test). Substance contains both non-biodegradable hydrocarbons and readily biodegradable hydrocarbons. Hydrolytically stable.

12.3 Bioaccumulative potential

This is a general term describing a process by which chemicals are taken up by aquatic organisms directly from water as well as from exposure through other routes, such as consumption of food and sediment containing the chemicals. The range of log Kow values and BCF-factors indicate that there might be constituents present in the substance having potential for bioaccumulation. However, there is evidence that the majority of organic chemicals with log Pow values of > ca. 7 would show low tendency to bioaccumulate.

12.4 Mobility in soil

Based on low water solubility and relatively high volatility and absorption potential to organic matter the migration to groundwater is expected to be low. According to the PETRORISK modelling results, major part of the emissions of the substance are distributed to air (ca. 97.6 %). Fractions distributed to other environmental compartments is expected to be low; water (1.7 %), sediment (0.45 %), soil (0.25 %).

12.5 Results of PBT and vPvB assessment

Persistent: This substance is persistent since it contains both biodegradable and non-biodegradable constituents. It is however considered as readily biodegradable in water.

Bioaccumulation: Based on test results from the octanol-water partitioning coefficient study (log Kow of 4.7) the substance might contain substances having potential for bioaccumulation. Bioconcentration factors and bioaccumulation factors were also estimated with the BCFBAF v3.01 model. The estimated log BCF value for the ten most abundant individual structures of the substance ranged from 2.02 to 3.08 (BCF 105 to 1202 L/kg). In conclusion, as the estimated BCF values are less than B or vB criteria (2000 and 5000 L/kg) this substance is not bioaccumulative or very bioaccumulative.

Toxic: The substance is toxic as this substance is classified as carcinogenic, mutagenic and toxic for reproduction.

Overall conclusions: The criteria for PBT or vPvB are not met.

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12.6 Other adverse effects

The substance has no potential for stratospheric ozone depletion for structural reasons. No reason for any hazard classification under CLP for atmospheric environment (the ozone layer).

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste should only be disposed of via a licensed waste contractor. The European Waste Catalogue (EWC) and European Waste List (EWL) is a harmonized list of wastes. Waste materials should be classified prior to final disposal with EWC-codes. Wastes and empty containers should be treated based on their classification and properties referring to local and national waste management regulations.

Waste management options: All waste containing residues of the substance should be disposed of as hazardous waste to authorized hazardous waste incineration plants, operated according to Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and Best Available Techniques for Waste Incineration as described in the respective BREF of August 2006. Based on the waste type and the fulfilment of the acceptance criteria of the Council Directive 1999/31/EC additional waste management methods such as landfill disposal might be used.

Packaging: The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor.

Contaminated packaging: Contaminated packaging should be emptied as far as possible and disposed of as hazardous waste to incineration plants in accordance with Directive 2000/76/EC. Clean packaging material should be subjected to waste management schemes (recovery, recycling, re-use) according to local waste management regulations.

Special precautions: The substance and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Waste from residues / unused products: Off-specification batches and unused products should be treated as hazardous waste.

Suitable waste codes:

- 16 03 05 * Organic wastes containing dangerous substances
- 15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances
- 15 01 10* Packaging containing residues of or contaminated by dangerous substances

SECTION 14. TRANSPORT INFORMATION

		<i>ADR/RID/ADN</i>
14.1	UN number	3295
14.2	UN proper shipping name	Hydrocarbons, liquid, n.o.s.
14.3	Transport hazard class(es)	3

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- 14.4 Packing group** II
- 14.5 Environmental hazards** Environmentally hazardous
- 14.6 Special precautions for users** -
Additional information ADN: vapor pressure at 50°C is below 110 kPa (measured)
hazards: 3 + N2 + CMR
- 14.7 Transport in Bulk (MARPOL 73/78, Annex I): Energy-rich fuels**

Alkanes C4-C12 linear, branched and cyclic. This cargo is considered an Energy-rich fuel and effective 1 January 2019 should be carried subject to Annex I of MARPOL, see Annex 12 of MEPC.2/Circ.24

SECTION 15. REGULATORY INFORMATION

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
EU Regulation (EC) No. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization substances of very high concern: None of the components are listed.
- 15.2 Chemical safety assessment**
In accordance with Regulation (EC) No. 1907/2006 (REACH) Article 14, a Chemical Safety Assessment has been carried out for this substance.

SECTION 16. OTHER INFORMATION

16.1 Additions, Deletions, Revisions

Section 14 bulk transport data updated according to AND regulations.

This cargo is considered an Energy-rich fuel and effective 1 January 2019 should be carried subject to Annex I of MARPOL, see Annex 12 of MEPC.2/Circ.24

16.2 Key or legend to abbreviations and acronyms

ASTM	American Society for Testing and Materials
BOEL	Binding Occupational exposure limit
CLP	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
DNEL	Derived no-effect level
DMEL	Derived minimum effect level
EL50	Loading rate of the substance that causes 50 % reduction of a certain effect on test organisms
EWC	European Waste Catalogue
GLP	Good Laboratory Practice
Koc	Soil adsorption coefficient
LL50	Loading rate of the substance that causes 50 % mortality of the test population
LD50	Lethal dose of the substance that causes 50 % mortality of the test population
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational exposure limit
PBT/vPvB	Persistent, bioaccumulative and toxic/ very persistent and very bioaccumulative
PNEC	Predicted no-effect concentration
REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals
STOT RE	Specific Target Organ Toxicity, Repeated Exposure

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STOT SE Specific Target Organ Toxicity, Single Exposure
TWA Time Weighted Average

16.3 Key literature references and sources for data

REACH Chemical Safety Report: Renewable hydrocarbons of wood origin (naphtha type fraction) dated 2014-03-04. All referenced studies within this safety data sheet can be found from the original Chemical Safety Report.

16.4 Classification procedure

The self-classification is conducted based on the experimental data on the substance and the read-across data on similar fossil fuels taken into account also the harmonised classification entries of fossil fuels, and the critical components in the renewable fuels (benzene, n-hexane and toluene). For long-term health hazards, the CLP mixture rules were applied when there was no adequate experimental data on the substance available.

16.5 Emergency telephone number

Europe-wide emergency number: 112

Contact a poison control centre. List of Telephone Numbers: **AUSTRIA** (Vienna Wien) +43 1 406 43 43; **BELGIUM** (Brussels Bruxelles) +32 70 245 245; **BULGARIA** (Sofia) +359 2 9154 409; **CZECH REPUBLIC** (Prague Praha) +420 224 919 293; **DENMARK** (Copenhagen) 82 12 12 12; **ESTONIA** (Tallinn) 112; **FINLAND** (Helsinki) +358 9 471 977; **FRANCE** (Paris) +33 1 40 0548 48; **GERMANY** (Berlin) +49 30 19240; **GREECE** (Athens Athinai) +30 10 779 3777; **HUNGARY** (Budapest) 06 80 20 11 99; **ICELAND** (Reykjavik) +354 525 111, +354 543 2222; **IRELAND** (Dublin) +353 1 8379964; **ITALY** (Rome) +3906 305 4343; **LATVIA** (Riga) +371 704 2468; **LITHUANIA** (Vilnius) +370 5 236 20 52 or +370 687 53378; **MALTA** (Valletta) 2425 0000; **NETHERLANDS** (Bilthoven) +31 30 274 88 88; **NORWAY** (Oslo) 22 591300; **POLAND** (Gdansk) +48 58301 65 16 or +48 58 349 2831; **PORTUGAL** (Lisbon Lisboa) 808 250 143; **ROMANIA** (Bucharest) +40 21 3183606; **SLOVAKIA** (Bratislava) +421 2 54 77 4166; **SLOVENIA** (Ljubljana) + 386 41 650500; **SPAIN** (Barcelona) +34 93 227 98 33 or +34 93 227 54 00 bleep 190; **SWEDEN** (Stockholm) 112 or +46 833 12 31 (mon-fri 9.00-17.00); **UNITED KINGDOM** (London) 112 or 0845 4647 (NHS Direct).

16.6 Recommended restrictions

DISCLAIMER OF LIABILITY:

The information in this SDS was obtained from recent Chemical Safety Report of this substance from REACH registration. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

Conforms to Annex II of Regulation (EC) No. 1907/2006 (REACH)

ANNEX TO EXTENDED SAFETY DATA SHEET

UPM BIOVERNO NAPHTA

Date: 6th June 2017

Previous date: 8th November 2016



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Version 4.0

Annex to extended Safety Data Sheet

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1: Distribution, use as an intermediate, and/or formulation & (re)packing of renewable naphtha (containing 0% to 1% benzene)

1. Title of Exposure scenario	
Free text title:	
Distribution of renewable naphtha (containing 0% to 1% benzene) (" Distribution ")	CSR-ES 3
Use of renewable naphtha as an intermediate (containing 0% to 1% benzene) (" Intermediate ")	CSR-ES 5
Formulation & (re)packing of renewable naphtha and mixtures (containing 0% to 1% benzene) (" Formulation ")	CSR-ES 7
Market sector: Distribution, use as an intermediate, formulation and (re)packing	PC: -
Description of process(es) covered in the Exposure Scenario:	
Environment:	
Distribution: ESVOC SPERC 1.1b.v1 Distribution of substance (industrial): solvent-borne	ESVOC SPERC 1.1b.v1
Intermediate: ESVOC SPERC 6.1a.v1 Use as an Intermediate (industrial): solvent-borne	ESVOC SPERC 6.1a.v1
Formulation: ESVOC SPERC 2.2.v1 Formulation and (re)packing of substances and mixtures (industrial): solvent-borne	ESVOC SPERC 2.2.v1
Worker contributing scenarios (Distribution, Intermediate, Formulation)	SU 3
Equipment cleaning and maintenance - indoor	PROC 8a
Equipment cleaning and maintenance - outdoor	PROC 8a
Bulk loading and unloading	PROC 8b
General process exposures - closed process (no sampling)	PROC 1
General process exposures - closed continuous process (with sampling)	PROC 2
General process exposures - closed batch process (with sampling)	PROC 3
Laboratory activities	PROC 15
Description of activities covered in the Exposure Scenario:	
Distribution: Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities.	
Intermediate: Use of a substance as an intermediate (industrial use resulting in manufacture of another substance). Includes material transfers, general process exposures, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities. Covers use in standard operating conditions in refineries.	
Formulation: Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities.	
2. Conditions of use affecting exposure	
2.1 Control of environmental exposure	
Product characteristics	
Properties of Renewable hydrocarbons (naphtha type fraction):	
As the substance is a UVCB substance, it was not possible to determine single definite values for the physico-chemical properties. Instead the assessment was based on the properties of representative individual structures as determined by the modeling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	0.02 - 1600 mg/L (experimental test result for the substance: 18 mg/L)
Log Henry's Law Constants	-3.44 – 0.93 (atm·m ³ /mol)
Log Kow	2.00 – 6.43 (experimental test result for the substance: 4.7)
Log Koc	1.83 – 5.20
Half-life - Air	1.5 – 66 h
Half-life – Water	1.6 – 55 d
Half-life – Soil	1.6 – 55 d
Half-life – Sediment	6.2 – 220 d

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Half-life - Wastewater	0.17 – 9.5 h		
Amounts used			
Annual use at a site:	Distribution: ≤ 30 tonnes/year Intermediate: ≤ 15 000 tonnes/year Formulation: ≤ 1500 tonnes/year		
Daily use at a site:	Distribution: ≤ 0.1 tonnes/day (SPERC default emission days 300 d/year) Intermediate: ≤ 50 tonnes/day (SPERC default emission days 300 d/year) Formulation: ≤ 5 tonnes/day (SPERC default emission days 300 d/year)		
Frequency and duration of use			
Continuous use/release (used > 12 times per year). Intermittent releases not evaluated.			
Environment factors not influenced by risk management			
Dilution factor - freshwater:	10		
Dilution factor – marine:	100		
Other given operational conditions affecting environmental exposure			
The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.			
Substance losses are reduced through use of general and site-specific risk management measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered equipment/processes to minimize evaporative losses of VOCs. Substance losses to waste water are generally restricted to equipment cleaning as processes operate without contact with water. Such uses and substance properties result in limited to no discharge to wastewater or to soil from the industrial site.			
Technical conditions and measures at process level (source) to prevent release			
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil			
Containment	Process optimized for efficient use of raw materials (minimal environmental release). Volatile compounds subject to air emission controls. Negligible wastewater emissions as process operates without water contact. Negligible air emissions as process operates in a contained system. Wastewater emission generated from equipment cleaning with water.		
	Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. <i>via</i> oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances.		
	Emission factor	Distribution	Intermediate
	water	0.001 %	0.03 %
air (final)	0.01 %	0.5 %	
soil	0.001 %	0.1 %	
soil	0.01 %	0.01 %	
Technical measures to reduce releases to air	Assumed air treatment efficiency: Distribution: 90 % Intermediate: 80 % Formulation: 0 % (incorporated in air emission factor) RMM that may be used to achieve required emission reduction: Wet scrubber – gas removal (70 %), air filtration – particle removal (80-99 %), thermal oxidation (98 %), vapour recovery – adsorption (80-90 %)		
Technical measures to reduce releases to water	Off-site / on-site technology (waste water treatment)		
Technical measures to reduce releases to soil	-		
Organizational measures to prevent/limit release from site			
Environmental, health and safety guidelines or written instructions on the standard operating procedure (SOP) are utilized. Environment, health and safety (EHS) responsibilities are defined and assigned in writing. Emergency action plans (Rescue training for accidental emissions) are created. Personnel are trained in environment, health and safety issues, i.e. in safe handling of chemicals and good housekeeping. General good hygiene and housekeeping.			

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Conditions and measures related to municipal sewage treatment plant

Municipal STP (off-site):	Yes (effectiveness 80 %). (alternatively treatment at an on-site WWTP)
Discharge rate of effluent	2000 m ³ /d
Application of sludge to soil	No

Conditions and measures related to external treatment of waste for disposal

Suitable waste codes:
 05 01 09* Sludges from on-site effluent treatment containing dangerous substances
 05 01 03* Tank bottom sludges
 05 01 06* Oily sludges from maintenance operations of the plant or equipment
 15 01 10* Packaging containing residues of or contaminated by dangerous substances
 15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances
 16 03 05 * Organic wastes containing dangerous substances
 160802* Spent catalysts containing dangerous transition metals (3) or dangerous transition metal compounds

Suitable disposal:
 All wastes containing residues of the substance or its hazardous degradation products should be disposed of as hazardous waste to authorized hazardous waste incineration plants, operated according to Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and Best Available Techniques for Waste Incineration as described in the respective BREF of August 2006.

Contaminated packaging: Contaminated packaging should be emptied as far as possible and disposed of as hazardous waste to incineration plants in accordance with Directive 2000/76/EC.

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

Assessment approach:
 Semi-quantitative exposure assessment and risk characterisation was conducted for long-term systemic effects via inhalation route and via dermal route. Qualitative exposure assessment and risk characterisation is conducted for skin irritation effects, aspiration toxicity, and for carcinogenic effects. The physico-chemical properties as input parameters for the exposure estimation are determined for benzene, which is the most critical component regarding the toxicological hazards.

Physical form:	liquid
Molecular weight:	78.11 g/mol
Vapour pressure:	10 kPa at 20 °C 100 kPa at 79.7 °C
Concentration of substance in product:	< 1 % (concentration of benzene in the product)

Frequency and duration of use/exposure and other operational conditions affecting workers exposure

Contributing scenario	PROC	duration	place of use	temperature
Equipment cleaning and maintenance - indoor	PROC 8a	1. < 1 h 2. < 8 h	Indoor	≤ 40 °C
Equipment cleaning and maintenance - outdoor	PROC 8a	1. < 1 h 2. < 8 h	Outdoor	≤ 40 °C
Bulk loading and unloading	PROC 8b	< 4 h	Outdoor	≤ 40 °C
General process exposures - closed process (no sampling)	PROC 1	< 8 h	Indoor	≤ 40 °C
General process exposures - closed continuous process (with sampling)	PROC 2	< 8 h	Indoor	≤ 40 °C
General process exposures - closed batch process (with sampling)	PROC 3	< 8 h	Indoor	≤ 40 °C
Laboratory activities	PROC 15	< 8 h	Indoor	≤ 40 °C

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Technical conditions and measures at process level (source) to prevent release				
Organisational measures to prevent /limit releases, dispersion and exposure				
Occupational Health and Safety Management System: Advanced				
Contributing scenario	PROC	Level of containment		
Equipment cleaning and maintenance	PROC 8a	No containment		
Bulk loading and unloading	PROC 8b	Semi-closed process with occasional controlled exposure		
General process exposures - closed process (no sampling)	PROC 1	Closed system (minimal contact during routine operations)		
General process exposures - closed continuous process (with sampling)	PROC 2	Closed continuous process with occasional controlled exposure		
General process exposures - closed batch process (with sampling)	PROC 3	Closed batch process with occasional controlled exposure		
Laboratory activities	PROC 15	No containment		
Technical conditions and measures to control dispersion from source towards the worker				
Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation *or operation undertaken outdoors	
Equipment cleaning and maintenance - indoor	PROC 8a	Yes (90 %): LEV or SOP (eg. drain down prior to maintenance)	Good (3-5 air changes per hour)	
Equipment cleaning and maintenance - outdoor	PROC 8a	Yes (90 %): LEV or SOP (eg. drain down prior to maintenance)	not applicable	
Bulk loading and unloading	PROC 8b	Yes (90 %): Material transfers under containment or extract ventilation	not applicable	
General process exposures - closed process (no sampling)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*	
General process exposures - closed continuous process (with sampling)	PROC 2	Yes (90 %): LEV / closed or semi-closed sampling points	Good (3-5 air changes per hour)*	
General process exposures - closed batch process (with sampling)	PROC 3	Yes (90 %): LEV / closed or semi-closed sampling points	Good (3-5 air changes per hour)*	
Laboratory activities	PROC 15	Yes (90 %): LEV	Good (3-5 air changes per hour)	
Conditions and measures related to personal protection, hygiene and health evaluation				
Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Equipment cleaning and maintenance – indoor / outdoor	PROC 8a	1. No (0 %) duration < 1 h 2. Yes (90 %) duration < 8 h	Eye protection: Goggles or safety glasses with side shields (EN166) Eye protection where there is potential for exposure. (PROC1: good practice advice, see below)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Bulk loading and unloading	PROC 8b	No (0 %)		
General process exposures - closed process (no sampling)	PROC 1	No (0 %)		
General process exposures - closed continuous process (with sampling)	PROC 2	No (0 %)		
General process exposures - closed batch process (with sampling)	PROC 3	No (0 %)		
Laboratory activities	PROC 15	No (0 %)		
Additional good practise advice beyond the REACH CSA				
<p>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.</p>				
Housekeeping: General good hygiene and housekeeping				
PROC1: Eye protection: Goggles or safety glasses with side shields (EN166) Eye protection where there is potential for exposure.				

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3. Exposure estimation and reference to its source

Environment: PETRORISK v6.02 risk assessment tool. The model calculations are based on physicochemical and ecotoxicological properties of individual hydrocarbon structures, so that PEC and PNEC and the risk characterisation by RCR are derived for representative structures that are used to simulate the UVCB substance. The sum of all individual RCR values indicates the overall risk for the substance as the environmental effects of the individual components are considered additive. RCR = PEC/PNEC, RCR value below 1 indicates safe use. PNEC determined by the PETRORISK tool for each representative constituent, range of PNEC values: PNECwastewater= 13 µg/L to 34 000 µg/L, PNECaquatic= 0.88 µg/L to 2100 µg/L, PNECsoil= 0.13 mg/kg ww to 2.7 mg/kg ww, PNECsediment= 0.33 mg/kg ww to 6.7 mg/kg ww. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Worker: CHESAR v. 2.2 - ECETOC TRA v. 3. RCR = Exposure estimate/DMEL, RCR value below 1 indicates safe use. Semi-quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation, aspiration toxicity, and carcinogenic effects.

Environment

Local exposure estimation and risk characterisation

The predicted exposure concentrations (PEC) and risk characterisation ratios (RCR) are reported in the following table. Concentration range for Distribution scenario is given for different end use scenarios (fuels, intermediate, coatings)

Protection target	Distribution	Intermediate	Formulation
Environmental Exposure			
PEC effluent (mg/L)	2.2E-05	3.2E-01	2.2E-02
PEC freshwater (mg/L)	2.2E-06 - 8.3E-06	3.2E-02	2.2E-03
PEC marine (mg/L)	2.2E-07	3.2E-03	2.2E-04
PEC freshwater sediment (mg/kg ww)	1.5E-05 - 3.5E-05	2.2E-01	1.5E-02
PEC marine sediment (mg/kg ww)	1.5E-06	2.2E-02	1.5E-03
PEC agricultural soil (mg/kg ww)	1.1E-07 - 3.6E-07	3.2E-04	1.5E-04
Environmental Risk			
RCR effluent	3.6E-06	5.4E-02	3.6E-03
RCR freshwater	5.6E-06 - 2.4E-05	8.4E-02	5.6E-03
RCR marine	5.6E-07	8.4E-03	5.6E-04
RCR freshwater sediment	6.4E-06 - 1.4E-05	9.6E-02	6.4E-03
RCR marine sediment	6.4E-07	9.6E-03	6.4E-04
RCR agricultural soil	3.7E-08 - 8.1E-08	5.4E-04	2.6E-04

Risk characterisation for man via the environment

Exposure estimation and risk characterisation was conducted quantitatively with the PETRORISK tool for indirect human exposure (inhalation, oral). According to modelling results, the estimated exposure level is low (combined RCR ranging from < 0.001 to 0.2).

Worker exposure

Quantitative assessment (long-term, systemic effects, inhalation and dermal route)

Estimated exposure via inhalation and dermal route and the corresponding risk characterisation ratios (RCR) are reported in the below table. Combined RCR = inhalation + dermal. DMEL(inhalation) = 3.25 mg/m³, DMEL(dermal) = 234 mg/kg bw/day.

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m ³)	RCR	Estimate (mg/kg bw/day)	RCR	
Equipment cleaning and maintenance - indoor	1. PROC 8a (< 1 h, no RPE)	1.139	0.351	0.055	<0.01	0.351
	2. PROC 8a (< 8 h, RPE)	0.57	0.175	0.274	0.001	0.175
Equipment cleaning and maintenance - outdoor	1. PROC 8a (< 1 h, no RPE)	1.139	0.351	0.055	<0.01	0.351
	2. PROC 8a (< 8 h, RPE)	0.5696	0.175	0.274	0.001	0.175
Bulk loading and unloading	PROC 8b	2.05	0.631	0.164	<0.01	0.631
General process exposures - closed process (no sampling)	PROC 1	0.002	<0.001	6.8E-4	<0.01	< 0.01

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General process exposures - closed continuous process (with sampling)	PROC 2	0.57	0.175	0.027	<0.01	0.175
General process exposures - closed batch process (with sampling)	PROC 3	1.139	0.351	0.014	<0.01	0.351
Laboratory activities	PROC 15	1.139	0.351	0.007	<0.01	0.351

Qualitative assessment

When implementing the presented conditions of use the risk level for systemic long term inhalation and dermal effects is low (RCR < 1), and contact with the substance is prevented/reduced so that adverse effects are avoided regarding skin irritancy, and carcinogenic and mutagenic effects. Aspiration toxicity: Oral exposure is not anticipated to be related to any of the supported uses. RMM to avoid contact or incidents by workers: do not ingest, implementation of basic standard of occupational hygiene, ensure adequate training and supervision, good standard of personal hygiene.

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

Environment

The exposure assessment and risk characterization for environment was conducted by using PETRORISK v6.02 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. See the relevant SPERC for additional information.

Human health exposure

The exposure assessment and risk characterization for inhalation exposure of workers was conducted by using Tier 1 ECETOC TRA v.3 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. Scaling of worker exposure can be done by using ECETOC TRA v.3 model by modifying the operational conditions.

Compliance can also be verified by monitoring, and by comparing the monitored level with the DMEL value. The use is considered safe if the measured emissions divided by the DMEL-value is resulting in a risk characterisation ratio (RCR) less than 1.

This exposure scenario does not address consumers or professional workers.

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2: Industrial uses of renewable naphtha in coatings (containing 0% to 1% benzene)

1. Title of Exposure scenario	
Free text title: Industrial uses of renewable naphtha in coatings (containing 0% to 1% benzene)	CSR-ES 9
Market sector: Coatings (paints, inks, adhesives etc.)	PC: 9a
Description of process(es) covered in the Exposure Scenario:	
Environment: ESVOC SPERC 4.3a.v1 Uses in Coatings (industrial): solvent-borne	ESVOC SPERC 4.3a.v1
Worker contributing scenarios	SU 3
Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a
Bulk transfers, material transfers	PROC 8b
General process exposures - closed process	PROC 1
Film formation - force drying	PROC 2
General batch process exposures	PROC 3
Laboratory activities	PROC 15
Description of activities covered in the Exposure Scenario:	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
2. Conditions of use affecting exposure	
2.1 Control of environmental exposure	
Product characteristics	
Properties of Renewable hydrocarbons (naphtha type fraction): As the substance is a UVCB substance, it was not possible to determine single definite values for the physico-chemical properties. Instead the assessment was based on the properties of representative individual structures as determined by the modeling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	0.02 - 1600 mg/L (experimental test result for the substance: 18 mg/L)
Log Henry's Law Constants	-3.44 – 0.93 (atm·m ³ /mol)
Log Kow	2.00 – 6.43 (experimental test result for the substance: 4.7)
Log Koc	1.83 – 5.20
Half-life - Air	1.5 – 66 h
Half-life – Water	1.6 – 55 d
Half-life – Soil	1.6 – 55 d
Half-life – Sediment	6.2 – 220 d
Half-life - Wastewater	0.17 – 9.5 h
Amounts used	
Annual use at a site:	≤ 1500 tonnes/year
Daily use at a site:	≤ 5 tonnes/day (SPERC default emission days 300 d/year)
Frequency and duration of use	
Continuous use/release (used > 12 times per year). Intermittent releases not evaluated.	
Environment factors not influenced by risk management	
Dilution factor - freshwater:	10
Dilution factor – marine:	100

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Other given operational conditions affecting environmental exposure

The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Substance losses are reduced through use of general and site-specific risk management measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered equipment/processes to minimize evaporative losses of VOCs. Substance losses to waste water are generally restricted to equipment cleaning as processes operate without contact with water. Such uses and substance properties result in limited to no discharge to wastewater or to soil from the industrial site.

Technical conditions and measures at process level (source) to prevent release
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Containment	Process optimized for efficient use of raw materials. Volatile compounds subject to air emission controls. Negligible wastewater emissions as process operates without water contact. Wastewater emissions generated from equipment cleaning with water.								
	Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. <i>via</i> oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances.								
	<table border="1"> <thead> <tr> <th>Environmental compartment</th> <th>Emission factor</th> </tr> </thead> <tbody> <tr> <td>water</td> <td>0.07 %</td> </tr> <tr> <td>air (final)</td> <td>9.8 %</td> </tr> <tr> <td>soil</td> <td>0 %</td> </tr> </tbody> </table>	Environmental compartment	Emission factor	water	0.07 %	air (final)	9.8 %	soil	0 %
	Environmental compartment	Emission factor							
	water	0.07 %							
air (final)	9.8 %								
soil	0 %								
Technical measures to reduce releases to air	Assumed air treatment efficiency: 90 % RMM that may be used to achieve required emission reduction: Wet scrubber – gas removal (70 %), air filtration – particle removal (80-99 %), thermal oxidation (98 %), vapour recovery – adsorption (80 %)								
Technical measures to reduce releases to water	Off-site / on-site technology (waste water treatment)								
Technical measures to reduce releases to soil	-								

Organizational measures to prevent/limit release from site

Environmental, health and safety guidelines or written instructions on the standard operating procedure (SOP) are utilized.
Environment, health and safety (EHS) responsibilities are defined and assigned in writing.
Emergency action plans (Rescue training for accidental emissions) are created.
Personnel are trained in environment, health and safety issues, i.e. in safe handling of chemicals and good housekeeping.
General good hygiene and housekeeping.

Conditions and measures related to municipal sewage treatment plant

Municipal STP (off-site):	Yes (effectiveness 80 %). (alternatively treatment at an on-site WWTP)
Discharge rate of effluent	2000 m ³ /d
Application of sludge to soil	No

Conditions and measures related to external treatment of waste for disposal

Suitable waste codes:
 08 01 11* Waste paint and varnish containing organic solvents or other dangerous substances
 08 01 13* Sludges from paint or varnish containing organic solvents or other dangerous substances
 08 01 19* Aqueous sludges containing paint or varnish containing organic solvents or other dangerous substances
 08 01 21* Waste paint or varnish remover
 08 03 12* Waste ink containing dangerous substances
 08 03 14* Ink sludges containing dangerous substances
 08 03 17* Waste printing toner containing dangerous substances
 15 01 10* Packaging containing residues of or contaminated by dangerous substances
 15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances

Suitable disposal:
 All wastes containing residues of the substance or its hazardous degradation products should be disposed of as hazardous waste to authorized

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hazardous waste incineration plants, operated according to Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and Best Available Techniques for Waste Incineration as described in the respective BREF of August 2006.

Contaminated packaging: Contaminated packaging should be emptied as far as possible and disposed of as hazardous waste to incineration plants in accordance with Directive 2000/76/EC.

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

Assessment approach:

Semi-quantitative exposure assessment and risk characterisation was conducted for long-term systemic effects via inhalation route and via dermal route. Qualitative exposure assessment and risk characterisation is conducted for skin irritation effects, aspiration toxicity, and for carcinogenic effects. The physico-chemical properties as input parameters for the exposure estimation are determined for benzene, which is the most critical component regarding the toxicological hazards.

Physical form:	liquid
Molecular weight:	78.11 g/mol
Vapour pressure:	10 kPa at 20 °C 100 kPa at 79.7 °C
Concentration of substance in product:	< 1 % (concentration of benzene in the product)

Frequency and duration of use/exposure and other operational conditions affecting workers exposure

Contributing scenario	PROC	duration	place of use	temperature
Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a	1. < 1 h 2. < 8 h	Indoor	≤ 40 °C
Bulk transfers, material transfers	PROC 8b	< 8 h	Indoor	≤ 40 °C
General process exposures - closed process	PROC 1	< 8 h	Indoor	≤ 40 °C
Film formation - force drying	PROC 2	< 8 h	Indoor	> 40 °C
General batch process exposures	PROC 3	< 8 h	Indoor	≤ 40 °C
Laboratory activities	PROC 15	< 8 h	Indoor	≤ 40 °C

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

Organisational measures to prevent /limit releases, dispersion and exposure

Occupational Health and Safety Management System: Advanced

Contributing scenario	PROC	Level of containment
Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a	No containment
Bulk transfers, material transfers	PROC 8b	Semi-closed process with occasional controlled exposure
General process exposures - closed process	PROC 1	Closed system (minimal contact during routine operations)
Film formation - force drying	PROC 2	Closed continuous process with occasional controlled exposure
General batch process exposures	PROC 3	Closed batch process with occasional controlled exposure
Laboratory activities	PROC 15	No containment

Technical conditions and measures to control dispersion from source towards the worker

Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation
Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a	Yes (90 %): <i>LEV or SOP (eg. drain down prior to maintenance)</i>	Good (3-5 air changes per hour)
Bulk transfers, material transfers	PROC 8b	Yes (95 %): <i>Material transfers under containment or extract ventilation</i>	Good (3-5 air changes per hour)
General process exposures - closed process	PROC 1	No (0 %)	Good (3-5 air changes per hour)

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Film formation - force drying	PROC 2	1. Yes (90 %): LEV 2. No (0 %)	1. Good (3-5 air changes per hour) 2. Enhanced (5-10 air changes per hour)
General batch process exposures	PROC 3	Yes (90 %): LEV	Good (3-5 air changes per hour)
Laboratory activities	PROC 15	Yes (90 %): LEV	Good (3-5 air changes per hour)

Conditions and measures related to personal protection, hygiene and health evaluation

Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h</i>	Eye protection: Goggles or safety glasses with side shields (EN166) <i>Eye protection where there is potential for exposure.</i> (PROC1: good practice advice, see below)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Bulk transfers, material transfers	PROC 8b	No (0 %)		
General process exposures - closed process	PROC 1	No (0 %)		
Film formation - force drying	PROC 2	No (0 %)		
General batch process exposures	PROC 3	No (0 %)		
Laboratory activities	PROC 15	No (0 %)		

Additional good practise advice beyond the REACH CSA

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.

Housekeeping: General good hygiene and housekeeping

PROC1: Eye protection: Goggles or safety glasses with side shields (EN166) *Eye protection where there is potential for exposure.*

3. Exposure estimation and reference to its source

Environment: PETRORISK v6.02 risk assessment tool. The model calculations are based on physicochemical and ecotoxicological properties of individual hydrocarbon structures, so that PEC and PNEC and the risk characterisation by RCR are derived for representative structures that are used to simulate the UVCB substance. The sum of all individual RCR values indicates the overall risk for the substance as the environmental effects of the individual components are considered additive. RCR = PEC/PNEC, RCR value below 1 indicates safe use. PNEC determined by the PETRORISK tool for each representative constituent, range of PNEC values: PNECwastewater= 13 µg/L to 34 000 µg/L, PNECaquatic= 0.88 µg/L to 2100 µg/L, PNECsoil= 0.13 mg/kg ww to 2.7 mg/kg ww, PNECsediment= 0.33 mg/kg ww to 6.7 mg/kg ww. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Worker: CHESAR v. 2.2 - ECETOC TRA v. 3. RCR = Exposure estimate/DMEL, RCR value below 1 indicates safe use. Semi-quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation, aspiration toxicity, and carcinogenic effects.

Environment

Local exposure estimation and risk characterisation

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

Protection target	Environmental Exposure	Protection target	Environmental Risk
PEC effluent (mg/L)	7.5E-02	RCR effluent	1.3E-02
PEC freshwater (mg/L)	7.5E-03	RCR freshwater	2.0E-02
PEC marine (mg/L)	7.5E-04	RCR marine	2.0E-03
PEC freshwater sediment (mg/kg ww)	5.2E-02	RCR freshwater sediment	2.2E-02
PEC marine sediment (mg/kg ww)	5.2E-03	RCR marine sediment	2.2E-03
PEC agricultural soil (mg/kg ww)	5.9E-04	RCR agricultural soil	1.0E-03

Risk characterisation for man via the environment

Exposure estimation and risk characterisation was conducted quantitatively with the PETRORISK tool for indirect human exposure (inhalation, oral). According to modelling results, the estimated exposure level is low (combined RCR = 0.3).

Worker exposure

Quantitative assessment (long-term, systemic effects, inhalation and dermal route)

Estimated exposure via inhalation and dermal route and the corresponding risk characterisation ratios (RCR) are reported in the below table. Combined RCR = inhalation + dermal. DMEL(inhalation) = 3.25 mg/m³, DMEL(dermal) = 234 mg/kg bw/day.

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Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m ³)	RCR	Estimate (mg/kg bw/day)	RCR	
Transfer from/pouring from containers (manual), cleaning and maintenance	1. PROC 8a (< 1 h, no RPE)	1.139	0.351	0.055	<0.01	0.351
	2. PROC 8a (< 8 h, RPE in use)	0.57	0.175	0.274	0.001	0.175
Bulk transfers, material transfers	PROC 8b	1.709	0.526	0.274	0.001	0.526
General process exposures - closed process	PROC 1	0.002	<0.001	6.8E-4	<0.01	<0.01
Film formation - force drying	1. PROC 2 (Good ventilation + LEV)	0.57	0.175	0.027	<0.01	0.175
	2. PROC 2 (Enhanced ventilation)	2.441	0.751	0.027	<0.01	0.751
General batch process exposures	PROC 3	1.139	0.351	0.014	<0.01	0.351
Laboratory activities	PROC 15	1.139	0.351	0.007	<0.01	0.351

Qualitative assessment

When implementing the presented conditions of use the risk level for systemic long term inhalation and dermal effects is low (RCR < 1), and contact with the substance is prevented/reduced so that adverse effects are avoided regarding skin irritancy, and carcinogenic and mutagenic effects. Aspiration toxicity: Oral exposure is not anticipated to be related to any of the supported uses. RMM to avoid contact or incidents by workers: do not ingest, implementation of basic standard of occupational hygiene, ensure adequate training and supervision, good standard of personal hygiene.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**Environment**

The exposure assessment and risk characterization for environment was conducted by using PETRORISK v6.02 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. See the relevant SPERC for additional information.

Human health exposure

The exposure assessment and risk characterization for inhalation exposure of workers was conducted by using Tier 1 ECETOC TRA v.3 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. Scaling of worker exposure can be done by using ECETOC TRA v.3 model by modifying the operational conditions.

Compliance can also be verified by monitoring, and by comparing the monitored level with the DMEL value. The use is considered safe if the measured emissions divided by the DMEL-value is resulting in a risk characterisation ratio (RCR) less than 1.

This exposure scenario does not address consumers or professional workers.

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3: Industrial use of renewable naphtha as a fuel (containing 0% to 1% benzene)

1. Title of Exposure scenario	
Free text title: Industrial use of renewable naphtha as a fuel (containing 0% to 1% benzene)	CSR-ES 10
Market sector: Fuels	PC: 13
Description of process(es) covered in the Exposure Scenario:	
Environment: ESVOC SPERC 7.12a.v1 Use as a Fuel (industrial): solvent-borne	ESVOC SPERC 7.12a.v1
Worker contributing scenarios	SU 3
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b
General use exposures as a fuel (no sampling)	PROC 1
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3
Use as a fuel. Use as a fuel additive diluent.	PROC 16
Description of activities covered in the Exposure Scenario:	
Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
2. Conditions of use affecting exposure	
2.1 Control of environmental exposure	
Product characteristics	
Properties of Renewable hydrocarbons (naphtha type fraction): As the substance is a UVCB substance, it was not possible to determine single definite values for the physico-chemical properties. Instead the assessment was based on the properties of representative individual structures as determined by the modeling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	0.02 - 1600 mg/L (experimental test result for the substance: 18 mg/L)
Log Henry's Law Constants	-3.44 – 0.93 (atm·m ³ /mol)
Log Kow	2.00 – 6.43 (experimental test result for the substance: 4.7)
Log Koc	1.83 – 5.20
Half-life - Air	1.5 – 66 h
Half-life – Water	1.6 – 55 d
Half-life – Soil	1.6 – 55 d
Half-life – Sediment	6.2 – 220 d
Half-life - Wastewater	0.17 – 9.5 h
Amounts used	
Annual use at a site:	≤ 1500 tonnes/year
Daily use at a site:	≤ 5 tonnes/day (SPERC default emission days 300 d/year)
Frequency and duration of use	
Continuous use/release (used > 12 times per year). Intermittent releases not evaluated.	
Environment factors not influenced by risk management	
Dilution factor - freshwater:	10
Dilution factor – marine:	100

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Other given operational conditions affecting environmental exposure

The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Substance losses are reduced through use of general and site-specific risk management measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered equipment/processes to minimize evaporative losses of VOCs. Substance properties and uses result in limited to no discharge to wastewater or to soil from the industrial site.

Technical conditions and measures at process level (source) to prevent release
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Containment	Process optimized for highly efficient use of raw materials (very minimal environmental release). Negligible wastewater emissions as process operates without water contact. Negligible air emissions as process operates in a contained system. No obligatory onsite RMMs assumed.
	Environmental compartment
	Emission factor
	water

air (final)	0.001 %
soil	0.25 %
	0 %

Technical measures to reduce releases to air	Assumed air treatment efficiency: 95 % RMM that may be used to achieve required emission reduction: Wet scrubber –thermal oxidation (98 %)
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Technical measures to reduce releases to water	Off-site / on-site technology (waste water treatment)
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Technical measures to reduce releases to soil	-
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Organizational measures to prevent/limit release from site

Environmental, health and safety guidelines or written instructions on the standard operating procedure (SOP) are utilized. Environment, health and safety (EHS) responsibilities are defined and assigned in writing. Emergency action plans (Rescue training for accidental emissions) are created. Personnel are trained in environment, health and safety issues, i.e. in safe handling of chemicals and good housekeeping. General good hygiene and housekeeping.

Conditions and measures related to municipal sewage treatment plant

Municipal STP (off-site):	Yes (effectiveness 80 %). (alternatively treatment at an on-site WWTP)
Discharge rate of effluent	2000 m ³ /d
Application of sludge to soil	No

Conditions and measures related to external treatment of waste for disposal

Suitable waste codes:

- 10 01 04* Oil fly ash and boiler dust
- 10 01 13* Fly ash from emulsified hydrocarbons used as fuel
- 10 01 20* Sludges from on-site effluent treatment containing dangerous substances
- 10 01 22* Aqueous sludges from boiler cleansing containing dangerous substances
- 13 05 02* Sludges from oil/water separators
- 13 05 06* Oil from oil/water separators
- 13 05 07* Oily water from oil/water separators
- 13 05 08* Mixtures of wastes from grit chambers and oil/water separators
- 13 07 01* Fuel oil and diesel
- 13 07 02* Petrol
- 13 07 03* Other fuels (including mixtures)
- 15 01 10* Packaging containing residues of or contaminated by dangerous substances
- 15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances

Suitable disposal:

All wastes containing residues of the substance or its hazardous degradation products should be disposed of as hazardous waste to authorized hazardous waste incineration plants, operated according to Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste

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and Best Available Techniques for Waste Incineration as described in the respective BREF of August 2006. The mineral wastes (e.g. ash) might be disposed off to the hazardous waste landfill if the acceptance criteria of waste at landfills are fulfilled according to Council Decision 2003/33/EC.

Contaminated packaging: Contaminated packaging should be emptied as far as possible and disposed of as hazardous waste to incineration plants in accordance with Directive 2000/76/EC.

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

Assessment approach:

Semi-quantitative exposure assessment and risk characterisation was conducted for long-term systemic effects via inhalation route and via dermal route. Qualitative exposure assessment and risk characterisation is conducted for skin irritation effects, aspiration toxicity, and for carcinogenic effects. The physico-chemical properties as input parameters for the exposure estimation are determined for benzene, which is the most critical component regarding the toxicological hazards.

Physical form:	liquid
Molecular weight:	78.11 g/mol
Vapour pressure:	10 kPa at 20 °C 100 kPa at 79.7 °C
Concentration of substance in product:	< 1 % (concentration of benzene in the product)

Frequency and duration of use/exposure and other operational conditions affecting workers exposure

Contributing scenario	PROC	duration	place of use	temperature
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. < 1 h 2. < 8 h	Indoor	≤ 40 °C
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. < 1 h 2. < 8 h	Outdoor	≤ 40 °C
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	< 8 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (no sampling)	PROC 1	< 8 h	Indoor	≤ 40 °C
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	< 8 h	Indoor	≤ 40 °C
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	< 8 h	Indoor	≤ 40 °C
Use as a fuel. Use as a fuel additive diluent.	PROC 16	< 8 h	Indoor	≤ 40 °C

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

Organisational measures to prevent /limit releases, dispersion and exposure

Occupational Health and Safety Management System: Advanced

Contributing scenario	PROC	Level of containment
Cleaning and maintenance (vehicles, boilers, storage tanks) - indoor/outdoor	PROC 8a	No containment
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	Semi-closed process with occasional controlled exposure
General use exposures as a fuel (no sampling)	PROC 1	Closed system (minimal contact during routine operations)
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	Closed continuous process with occasional controlled exposure
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	Closed batch process with occasional controlled exposure
Use as a fuel. Use as a fuel additive diluent.	PROC 16	Closed system (minimal contact during routine operations)

Technical conditions and measures to control dispersion from source towards the worker

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Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation *or operation undertaken outdoors
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (90 %): <i>LEV or SOP (eg. drain down prior to maintenance)</i>	Good (3-5 air changes per hour)
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (90 %): <i>LEV or SOP (eg. drain down prior to maintenance)</i>	not applicable
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	Yes (95 %): <i>Material transfers under containment or extract ventilation</i>	Good (3-5 air changes per hour) (<i>indoor</i>)
General use exposures as a fuel (no sampling)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	Yes (90 %): <i>LEV</i>	Good (3-5 air changes per hour)*
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	1. Yes (90 %): <i>LEV</i> 2. No (0 %)	Good (3-5 air changes per hour)*
Use as a fuel. Use as a fuel additive diluent.	PROC 16	1. Yes (90 %): <i>LEV</i> 2. No (0 %)	Good (3-5 air changes per hour)*

Conditions and measures related to personal protection, hygiene and health evaluation

Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h</i>	Eye protection: Goggles or safety glasses with side shields (EN166) <i>Eye protection where there is potential for exposure.</i> (PROC1, PROC16: good practice advice)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h</i>		
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	No (0 %)		
General use exposures as a fuel (no sampling)	PROC 1	No (0 %)		
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	No (0 %)		
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	1. No (0 %) <i>LEV in use</i> 2. Yes (90 %) <i>no LEV in use</i>		
Use as a fuel. Use as a fuel additive diluent.	PROC 16	1. No (0 %) <i>LEV in use</i> 2. Yes (90 %) <i>no LEV in use</i>		

Additional good practise advice beyond the REACH CSA

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.

Housekeeping: General good hygiene and housekeeping

PROC1, PROC16: Eye protection: Goggles or safety glasses with side shields (EN166) *Eye protection where there is potential for exposure.*

3. Exposure estimation and reference to its source

Environment: PETRORISK v6.02 risk assessment tool. The model calculations are based on physicochemical and ecotoxicological properties of individual hydrocarbon structures, so that PEC and PNEC and the risk characterisation by RCR are derived for representative structures that are used to simulate the UVCB substance. The sum of all individual RCR values indicates the overall risk for the substance as the environmental effects of the individual components are considered additive. RCR = PEC/PNEC, RCR value below 1 indicates safe use. PNEC determined by the PETRORISK tool for each representative constituent, range of PNEC values: PNECwastewater= 13 µg/L to 34 000 µg/L, PNECaquatic= 0.88 µg/L to 2100 µg/L, PNECsoil= 0.13 mg/kg ww to 2.7 mg/kg ww, PNECsediment= 0.33 mg/kg ww to 6.7 mg/kg ww. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Worker: CHESAR v. 2.2 - ECETOC TRA v. 3. RCR = Exposure estimate/DMEL, RCR value below 1 indicates safe use. Semi-quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation, aspiration toxicity, and carcinogenic effects.

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Environment						
Local exposure estimation and risk characterisation						
The predicted exposure concentrations (PEC) and risk characterisation ratios (RCR) are reported in the following table.						
Protection target	Environmental Exposure	Protection target	Environmental Risk			
PEC effluent (mg/L)	1.1E-03	RCR effluent	1.8E-04			
PEC freshwater (mg/L)	1.1E-04	RCR freshwater	2.8E-04			
PEC marine (mg/L)	1.1E-05	RCR marine	2.8E-05			
PEC freshwater sediment (mg/kg ww)	7.4E-04	RCR freshwater sediment	3.2E-04			
PEC marine sediment (mg/kg ww)	7.4E-05	RCR marine sediment	3.2E-05			
PEC agricultural soil (mg/kg ww)	1.5E-05	RCR agricultural soil	2.6E-05			
Risk characterisation for man via the environment						
Exposure estimation and risk characterisation was conducted quantitatively with the PETRORISK tool for indirect human exposure (inhalation, oral). According to modelling results, the estimated exposure level is low (combined RCR < 0.01).						
Worker exposure						
Quantitative assessment (long-term, systemic effects, inhalation and dermal route)						
Estimated exposure via inhalation and dermal route and the corresponding risk characterisation ratios (RCR) are reported in the below table. Combined RCR = inhalation + dermal. DMEL(inhalation) = 3.25 mg/m ³ , DMEL(dermal) = 234 mg/kg bw/day.						
Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m ³)	RCR	Estimate (mg/kg bw/day)	RCR	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	1. PROC 8a (< 1 h, no RPE)	1.139	0.351	0.055	<0.01	0.351
	2. PROC8a (< 8 h, RPE)	0.57	0.175	0.274	0.001	0.175
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	1. PROC 8a (< 1 h, no RPE)	1.139	0.3505	0.055	<0.01	0.351
	2. PROC8a (< 8 h, RPE)	0.5696	0.1752	0.274	0.001	0.175
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	1. PROC 8b (indoor)	1.709	0.526	0.274	0.001	0.527
	2. PROC 8b (outdoor)	1.709	0.526	0.274	0.001	0.527
General use exposures as a fuel (no sampling)	PROC 1	0.002	<0.001	6.8E-4	<0.01	<0.01
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	0.57	0.175	0.027	<0.01	0.175
General exposures closed batch system (eg. In-line additive dosing equipment)	1. PROC 3 (with LEV)	1.139	0.351	0.014	<0.01	0.351
	2. PROC3 (with RPE)	1.139	0.351	0.014	<0.01	0.351
Use as a fuel. Use as a fuel additive diluent.	1. PROC 16 (with LEV)	0.57	0.175	0.007	<0.01	0.175
	2. PROC 16 (with RPE)	0.57	0.175	0.007	<0.01	0.175
Qualitative assessment						
When implementing the presented conditions of use the risk level for systemic long term inhalation and dermal effects is low (RCR < 1), and contact with the substance is prevented/reduced so that adverse effects are avoided regarding skin irritancy, and carcinogenic and mutagenic effects. Aspiration toxicity: Oral exposure is not anticipated to be related to any of the supported uses. RMM to avoid contact or incidents by workers: do not ingest, implementation of basic standard of occupational hygiene, ensure adequate training and supervision, good standard of personal hygiene.						
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES						
Environment						
The exposure assessment and risk characterization for environment was conducted by using PETRORISK v6.02 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. See the relevant SPERC for additional information.						

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Human health exposure

The exposure assessment and risk characterization for inhalation exposure of workers was conducted by using Tier 1 ECETOC TRA v.3 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. Scaling of worker exposure can be done by using ECETOC TRA v.3 model by modifying the operational conditions.

Compliance can also be verified by monitoring, and by comparing the monitored level with the DMEL value. The use is considered safe if the measured emissions divided by the DMEL-value is resulting in a risk characterisation ratio (RCR) less than 1.

This exposure scenario does not address consumers or professional workers.

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4: Professional use or renewable naphtha as a fuel (containing 0% to 1% benzene)

1. Title of Exposure scenario	
Free text title: Professional use or renewable naphtha as a fuel (containing 0% to 1% benzene)	CSR-ES 11
Market sector: Fuels	PC: 13
Description of process(es) covered in the Exposure Scenario:	
Environment: ESVOC SPERC 9.12b.v1 Use as a Fuel (wide dispersive use): solvent-borne	ESVOC SPERC 9.12b.v1
Worker contributing scenarios	SU 22
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b
General use exposures as a fuel (no likelihood of exposure)	PROC 1
General use exposures as a fuel (occasional exposure)	PROC 2
Use as a fuel	PROC 16
Description of activities covered in the Exposure Scenario:	
Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
2. Conditions of use affecting exposure	
2.1 Control of environmental exposure	
Product characteristics	
Properties of Renewable hydrocarbons (naphtha type fraction): As the substance is a UVCB substance, it was not possible to determine single definite values for the physico-chemical properties. Instead the assessment was based on the properties of representative individual structures as determined by the modeling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	0.02 - 1600 mg/L (experimental test result for the substance: 18 mg/L)
Log Henry's Law Constants	-3.44 – 0.93 (atm·m ³ /mol)
Log Kow	2.00 – 6.43 (experimental test result for the substance: 4.7)
Log Koc	1.83 – 5.20
Half-life - Air	1.5 – 66 h
Half-life – Water	1.6 – 55 d
Half-life – Soil	1.6 – 55 d
Half-life – Sediment	6.2 – 220 d
Half-life - Wastewater	0.17 – 9.5 h
Amounts used	
Annual use - local:	≤ 0.75 tonnes/year
Daily use - local:	≤ 0.0021 tonnes/day (SPERC default emission days 365 d/year)
Frequency and duration of use	
Continuous use/release (used > 12 times per year). Intermittent releases not evaluated.	
Environment factors not influenced by risk management	
Dilution factor - freshwater:	10
Dilution factor – marine:	100
Other given operational conditions affecting environmental exposure	

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The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.
Some disposal via wastewater assumed. As a default, wastewaters are treated off site (municipal STP) and sludge is applied to agricultural soil. Obligatory RMM are not assumed for wide dispersive uses.

Technical conditions and measures at process level (source) to prevent release
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Containment	Professional product use leading to emission of volatiles to air. Professional product use leading to disposal via the wastewater. No obligatory onsite RMMs assumed.	
	Environmental compartment	Emission factor
	water	0.001 %
	air (final)	1 %
	soil	0.001 %

Technical measures to reduce releases to air: None (Professional product use with limited or no technical control of emission).

Technical measures to reduce releases to water: Off-site waste water treatment (municipal STP)

Technical measures to reduce releases to soil: -

Organizational measures to prevent/limit release from site

General good hygiene and housekeeping.

Conditions and measures related to municipal sewage treatment plant

Municipal STP (off-site):	Yes (effectiveness 80 %).
Discharge rate of effluent	2000 m ³ /d
Application of sludge to soil	Yes

Conditions and measures related to external treatment of waste for disposal

Suitable waste codes:
 13 05 02* Sludges from oil/water separators
 13 05 06* Oil from oil/water separators
 13 05 07* Oily water from oil/water separators
 13 05 08* Mixtures of wastes from grit chambers and oil/water separators
 13 07 01* Fuel oil and diesel
 13 07 02* Petrol
 13 07 03* Other fuels (including mixtures)
 15 01 10* Packaging containing residues of or contaminated by dangerous substances
 15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances

Suitable disposal:
 All wastes containing residues of the substance or its hazardous degradation products should be disposed of as hazardous waste to authorized hazardous waste incineration plants, operated according to Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and Best Available Techniques for Waste Incineration as described in the respective BREF of August 2006. The mineral wastes (e.g. ash) might be disposed off to the hazardous waste landfill if the acceptance criteria of waste at landfills are fulfilled according to Council Decision 2003/33/EC.

 Contaminated packaging: Contaminated packaging should be emptied as far as possible and disposed of as hazardous waste to incineration plants in accordance with Directive 2000/76/EC.

Conditions and measures related to external recovery of waste

Not relevant.

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2.2 Control of workers exposure				
Product characteristic				
Assessment approach: Semi-quantitative exposure assessment and risk characterisation was conducted for long-term systemic effects via inhalation route and via dermal route. Qualitative exposure assessment and risk characterisation is conducted for skin irritation effects, aspiration toxicity, and for carcinogenic effects. The physico-chemical properties as input parameters for the exposure estimation are determined for benzene, which is the most critical component regarding the toxicological hazards.				
Physical form:	liquid			
Molecular weight:	78.11 g/mol			
Vapour pressure:	10 kPa at 20 °C 100 kPa at 79.7 °C			
Concentration of substance in product:	< 1 % (concentration of benzene in the product)			
Frequency and duration of use/exposure and other operational conditions affecting workers exposure				
Contributing scenario	PROC	duration	place of use	temperature
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. < 15 min 2. < 8 h	Indoor	≤ 40 °C
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. < 1 h 2. < 8 h	Outdoor	≤ 40 °C
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	< 1 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (no likelihood of exposure)	PROC 1	< 8 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (occasional exposure)	PROC 2	1. < 8 h 2. < 1 h	Indoor	≤ 40 °C
Use as a fuel	PROC 16	1. < 8 h 2. < 1 h	1. Indoor 2. Outdoor	≤ 40 °C
Technical conditions and measures at process level (source) to prevent release				
Organisational measures to prevent /limit releases, dispersion and exposure				
Occupational Health and Safety Management System: Basic				
Contributing scenario	PROC	Level of containment		
Cleaning and maintenance (vehicles, boilers, storage tanks) - indoor/outdoor	PROC 8a	No containment		
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	Semi-closed process with occasional controlled exposure		
General use exposures as a fuel (no likelihood of exposure)	PROC 1	Closed system (minimal contact during routine operations)		
General use exposures as a fuel (occasional exposure)	PROC 2	Closed continuous process with occasional controlled exposure		
Use as a fuel	PROC 16	Closed system (minimal contact during routine operations)		
Technical conditions and measures to control dispersion from source towards the worker				
Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (80 %): LEV or SOP (eg. drain down prior to maintenance)	Good (3-5 air changes per hour)	
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (80 %): LEV or SOP (eg. drain down prior to maintenance)	not applicable	
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	Yes (90 %): Material transfers under containment or extract ventilation	Good (3-5 air changes per hour) (indoor)	

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General use exposures as a fuel (no likelihood of exposure)	PROC 1	No (0 %)	Good (3-5 air changes per hour) (<i>indoor</i>)
General use exposures as a fuel (occasional exposure)	PROC 2	1. Yes (80 %): <i>LEV or use under containment</i> 2. No (0 %)	Good (3-5 air changes per hour)
Use as a fuel	PROC 16	1. Yes (80 %): <i>LEV or use under containment</i> 2. No (0 %)	Good (3-5 air changes per hour) (<i>indoor</i>)

Conditions and measures related to personal protection, hygiene and health evaluation

Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. No (0 %) <i>duration < 15 min</i> 2. Yes (90 %) <i>duration < 8 h</i>	Eye protection: Goggles or safety glasses with side shields (EN166)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h</i>		
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	No (0 %)	<i>Eye protection where there is potential for exposure.</i> (PROC1, PROC16: good practice advice, see below)	(PROC16: good practice advice, see below)
General use exposures as a fuel (no likelihood of exposure)	PROC 1	No (0 %)		
General use exposures as a fuel (occasional exposure)	PROC 2	No (0 %)		
Use as a fuel	PROC 16	No (0 %)		

Additional good practise advice beyond the REACH CSA

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.

Housekeeping: General good hygiene and housekeeping
 PROC1, PROC16: Eye protection: Goggles or safety glasses with side shields (EN166) *Eye protection where there is potential for exposure.*
 PROC16: Dermal Protection: Yes (chemically resistant gloves conforming to EN374)

3. Exposure estimation and reference to its source

Environment: PETRORISK v6.02 risk assessment tool. The model calculations are based on physicochemical and ecotoxicological properties of individual hydrocarbon structures, so that PEC and PNEC and the risk characterisation by RCR are derived for representative structures that are used to simulate the UVCB substance. The sum of all individual RCR values indicates the overall risk for the substance as the environmental effects of the individual components are considered additive. RCR = PEC/PNEC, RCR value below 1 indicates safe use. PNEC determined by the PETRORISK tool for each representative constituent, range of PNEC values: PNECwastewater= 13 µg/L to 34 000 µg/L, PNECaquatic= 0.88 µg/L to 2100 µg/L, PNECsoil= 0.13 mg/kg ww to 2.7 mg/kg ww, PNECsediment= 0.33 mg/kg ww to 6.7 mg/kg ww. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

Worker: CHESAR v. 2.2 - ECETOC TRA v. 3. RCR = Exposure estimate/DMEL, RCR value below 1 indicates safe use. Semi-quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation, aspiration toxicity, and carcinogenic effects.

Environment

Local exposure estimation and risk characterisation

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

Protection target	Environmental Exposure	Protection target	Environmental Risk
PEC effluent (mg/L)	4.4E-07	RCR effluent	7.5E-08
PEC freshwater (mg/L)	3.5E-07	RCR freshwater	1.1E-06
PEC marine (mg/L)	4.4E-09	RCR marine	1.2E-08
PEC freshwater sediment (mg/kg ww)	1.3E-06	RCR freshwater sediment	4.9E-07
PEC marine sediment (mg/kg ww)	3.0E-08	RCR marine sediment	1.3E-08
PEC agricultural soil (mg/kg ww)	1.0E-07	RCR agricultural soil	1.0E-07

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Risk characterisation for man via the environment

Exposure estimation and risk characterisation was conducted quantitatively with the PETRORISK tool for indirect human exposure (inhalation, oral). According to modelling results, the estimated exposure level is low (combined RCR < 0.0001).

Worker exposure

Quantitative assessment (long-term, systemic effects, inhalation and dermal route)

Estimated exposure via inhalation and dermal route and the corresponding risk characterisation ratios (RCR) are reported in the below table. Combined RCR = inhalation + dermal. DMEL(inhalation) = 3.25 mg/m³, DMEL(dermal) = 234 mg/kg bw/day.

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m ³)	RCR	Estimate (mg/kg bw/day)	RCR	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	1. PROC 8a (duration < 15 min)	2.278	0.701	0.027	<0.01	0.701
	2. PROC 8a (duration < 8 h, RPE)	2.278	0.701	0.274	0.001	0.701
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	1. PROC 8a (duration < 1 h)	2.278	0.701	0.055	<0.01	0.701
	2. PROC 8a (duration < 8 h, RPE)	1.139	0.351	0.274	0.001	0.351
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	1. PROC 8b (indoor)	1.139	0.351	0.055	<0.01	0.351
	2. PROC 8b (outdoor)	1.139	0.351	0.055	<0.01	0.351
General use exposures as a fuel (no likelihood of exposure)	1. PROC 1 (indoor)	0.023	0.007	6.8E-4	<0.01	< 0.01
	2. PROC 1 (outdoor)	0.023	0.007	6.8E-4	<0.01	< 0.01
General use exposures as a fuel (occasional exposure)	1. PROC 2 (duration < 8 h, LEV)	2.278	0.701	0.027	<0.01	0.701
	2. PROC 2 (duration < 1 h)	2.278	0.701	0.005	<0.01	0.701
Use as a fuel	1. PROC 16 (indoor, duration < 8 h, LEV)	2.278	0.701	0.034	<0.01	0.701
	2. PROC 16 (outdoor, duration < 1 h)	2.278	0.701	0.007	<0.01	0.701

Qualitative assessment

When implementing the presented conditions of use the risk level for systemic long term inhalation and dermal effects is low (RCR < 1), and contact with the substance is prevented/reduced so that adverse effects are avoided regarding skin irritancy, and carcinogenic and mutagenic effects. Aspiration toxicity: Oral exposure is not anticipated to be related to any of the supported uses. RMM to avoid contact or incidents by workers: do not ingest, implementation of basic standard of occupational hygiene, ensure adequate training and supervision, good standard of personal hygiene.

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

Environment

The exposure assessment and risk characterization for environment was conducted by using PETRORISK v6.02 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. See the relevant SPERC for additional information.

Human health exposure

The exposure assessment and risk characterization for inhalation exposure of workers was conducted by using Tier 1 ECETOC TRA v.3 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. Scaling of worker exposure can be done by using ECETOC TRA v.3 model by modifying the operational conditions.

Compliance can also be verified by monitoring, and by comparing the monitored level with the DMEL value. The use is considered safe if the measured emissions divided by the DMEL-value is resulting in a risk characterisation ratio (RCR) less than 1.

This exposure scenario does not address consumers or industrial workers.