

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Issue date: 3/25/202019 Revision date: 13/1/2022 Version: 6.0



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

1.1. Product identifier

Product form : Substance (UVCB)
Trade name : UPM BIOVERNO DIESEL
IUPAC name : Renewable hydrocarbons of wood origin (diesel type fraction)
EC-No. : 700-916-7
CAS-No. : Not available
REACH registration No : 01-2120052680-62-0000

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

1.2.1. Relevant identified uses

Main use category : Professional use
Use of the substance/mixture : Distribution and formulation and use as intermediate. Use as fuel or in coatings.
Use of the substance/mixture : Fuels

1.2.2. Uses advised against

Restrictions on use : 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: productstewardship@upm.com

1.4. Emergency telephone number

Emergency number : 112

Country	Organisation/Company	Address	Emergency number	Comment
Austria	Vergiftungsinformationszentrale	Stubenring 6 1010 Wien	+43 1 406 43 43	
Belgium	Centre Anti-Poisons/Antigifcentrum c/o Hôpital Central de la Base - Reine Astrid	Rue Bruyn 1 1120 Bruxelles/Brussel	+32 70 245 245	Please dial: 070 245 245 for any urgent questions about intoxication (free of charge 24/7), if not accessible, dial: 02 264 96 30 (standard fee)
Bulgaria	Национален токсикологичен информационен център Многопрофилна болница за активно лечение и спешна медицина "Н.И.Пирогов"	бул. Ген. Едуард И. Тотлебен 21 1606 София	+359 2 9154 233	
Croatia	Centar za kontrolu otrovanja Institut za medicinska istraživanja i medicinu rada	Ksaverska Cesta 2 p.p. 291 10000 Zagreb	+385 1 234 8342	Information available 24/7 in Croatian and English
Cyprus	Κέντρου Δηλητηριάσεων		1401	Operating hours 24 hours / 24 hours, 7 days a week

Country	Organisation/Company	Address	Emergency number	Comment
Czech Republic	Toxikologické informační středisko Klinika pracovního lékařství VFN a 1. LF UK	Na Bojišti 1 120 00 Praha 2	+420 224 919 293 +420 224 915 402	
Denmark	Gifflinjen Bispebjerg Hospital	Bispebjerg Bakke 23 Opgang 20 C 2400 København NV	+45 82 12 12 12	
Estonia	Mürgistusteabekeskus Terviseamet	Paldiski mnt 81 10617 Tallinn	16662 +372 7943 794	Calling the hotline is anonymous and at the cost of a local call.
Finland	Myrkytystietokeskus	Stenbäckinkatu 9 PO BOX 100 00029 Helsinki	+358 9 471 977 +358 800 147 111	Open 24 hours a day 0800 147 111 (free of charge) 09 471 977 (normal rate call)
France	Centre Antipoison et de Toxicovigilance de Angers C.H.U	4, rue Larrey 49033 Angers Cedex 9	+33 2 41 48 21 21	
Germany	Giftnotruf der Charité - Universitätsmedizin Berlin CBF, Haus VIII (Wirtschaftsgebäude), UG	Hindenburgdamm 30 12203 Berlin	+49 (0) 30 19240	
Greece	Poisons Information Centre Children's Hospital P&A Kyriakou	11762 Athens	+30 21 07 79 37 77	
Hungary	Nemzeti Népegészségügyi Központ Egészségügyi Toxikológiai Tájékoztató Szolgálat	Albert Flórián út 2-6 1097 Budapest	+36 80 20 11 99 +36 1 476 6464	Emergency number 1: (0-24 hours, free of charge - only from Hungary) Emergency number 2: (0-24 hours, can be called for a normal fee - also from abroad)
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	
Italy	Centro Antiveleni di Roma CAV Policlinico "A. Gemelli", Dipartimento di Tossicologia Clinica Universita Cattolica del Sacro Cuore	Largo Agostino Gemelli, 8 00168 Roma	+39 06 305 4343	
Latvia	Toksikoloģijas un sepses klīnikas Saindēšanās un zāļu informācijas centrs	Hipokrāta 2 1038 Rīga	+371 67 04 24 73	
Lithuania	Apsinuodijimų informacijos biuras	Šiltnamių g. 29 04130 Vilnius	+370 5 236 20 52 +370 687 53378	
Luxembourg	Centre Anti-Poisons/Antigifcentrum c/o Hôpital Central de la Base - Reine Astrid	Rue Bruyn 1 1120 Bruxelles/Brussel	+352 8002 5500	Free telephone number with a 24/7 access. Experts answer all urgency questions on dangerous products in French, or German
Malta	Medicines & Poisons Info Office	Mater Dei Hospital MSD 2090 Msida	+356 2545 6508	

Country	Organisation/Company	Address	Emergency number	Comment
Netherlands	Nationaal Vergiftigingen Informatie Centrum	Huispostnummer B.00.118 Postbus 85500 3508 GA Utrecht	+31 30 274 88 88	Only for the purpose of informing medical personnel in cases of acute intoxications
Poland	Szpital Praski p.w. Przemienienia Pańskiego Sp. z o.o.	Aleja Solidarności 67 03-401 Warszawa	+48 22 619 66 54 +48 22 619 08 97	
Portugal	Centro de Informação Antivenenos Instituto Nacional de Emergência Médica	Rua Almirante Barroso, 36 1000-013 Lisboa	+351 800 250 250	
Romania	TOXAPEL Emergency Clinical Hospital for Children "Grigore Alexandrescu"	Bulevardul Iancu de Hunedoara 30-32 Bucuresti	+40 2121 06282 +40 2121 06183	
Slovakia	Národné toxikologické informačné centrum Univerzitná nemocnica Bratislava, pracovisko Kramáre, Klinika pracovného lekárstva a toxikológie	Limbová 5 833 05 Bratislava	+421 2 54 77 41 66	
Slovenia	Center za klinično toksikologijo in farmakologijo Univerzitetni klinični, Center Ljubljana	Zaloška 7 1000 Ljubljana	+386 522 52 83	
Spain	Servicio de Información Toxicológica Instituto Nacional de Toxicología y Ciencias Forenses, Departamento de Madrid	C/José Echegaray nº4 28232 Las Rozas de Madrid	+34 91 562 04 20	(Toxicological emergencies only). Information in Spanish (24/7)
Sweden	Giftinformationscentralen	Solna Strandväg 21 171 54 Solna	112 – begär Giftinformation 010-456 6700 i mindre brådskande fall	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin corrosion/irritation, Category 2	H315
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment – Chronic Hazard, Category 3	H412
Full text of H- and EUH-statements: see section 16	

Adverse physicochemical, human health and environmental effects

Causes skin irritation. May be fatal if swallowed and enters airways. Harmful to aquatic life with long lasting effects.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements (CLP)

: P273 - Avoid release to the environment.

P280 - Wear protective gloves/protective clothing/eye protection/face protection..
P301+P310+P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Do NOT induce vomiting.
P302+P352 - IF ON SKIN: Wash with plenty of plenty of soap and water.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards

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

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

SECTION 3: Composition/information on ingredients

3.1. Substances

Comments : This substance is an UVCB substance and predominantly rich in saturated hydrocarbons with a carbon number range from C9 to C20.
Substance type : UVCB

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Renewable hydrocarbons of wood origin (diesel type fraction)	EC-No.: 700-916-7 REACH-no: 01-2120052680-62-0000	100	Asp. Tox. 1, H304 Skin Irrit. 2, H315 Aquatic Chronic 3, H412

Full text of H- and EUH-statements: see section 16

Comments : Predominantly rich in saturated hydrocarbons with a carbon number range from C9 to C20. The substance contains benzene ≥ 0 to < 0.1 % (w/w), naphthalene ≥ 0.001 — ≤ 0.5 % (w/w) and n-hexane ≥ 0 to < 2.0 % (w/w).

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Call a physician.
First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If oil mist has been inhaled, obtain medical attention (risk of chemical pneumonitis).
First-aid measures after skin contact : Wash skin with plenty of water. Take off contaminated clothing. If skin irritation occurs: Get medical advice/attention.
First-aid measures after eye contact : Immediately rinse with water for a prolonged period while holding the eyelids wide open. If symptoms persist, call a physician.
First-aid measures after 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.

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

Symptoms/effects : Causes eye irritation. May be fatal if swallowed and enters airways. May cause damage to organs through prolonged or repeated exposure.
Symptoms/effects after skin contact : Irritation.
Symptoms/effects after ingestion : Risk of lung oedema.

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

Treat symptomatically. If possible, show the doctor this safety data sheet. Failing this, show the doctor the packaging or label.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- | | |
|--------------------------------|--|
| Suitable extinguishing media | : Dry powder. Foam. Carbon dioxide. |
| Unsuitable extinguishing media | : Do not use water jet. Do not use extinguishing media containing water. |

5.2. Special hazards arising from the substance or mixture

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|--|--------------------------------|
| Hazardous decomposition products in case of fire | : Toxic fumes may be released. |
|--|--------------------------------|

5.3. Advice for firefighters

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|--------------------------------|---|
| Protection during firefighting | : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing. Cool down the containers exposed to heat with a water spray. |
|--------------------------------|---|

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

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|----------------------|--|
| Emergency procedures | : Ventilate spillage area. Avoid contact with skin and eyes. Remove ignition sources. Stop leak if safe to do so. Use appropriate personal protection equipment (PPE). |
|----------------------|--|

6.1.2. For emergency responders

- | | |
|----------------------|---|
| Protective equipment | : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection". |
|----------------------|---|

6.2. Environmental precautions

Avoid release to the environment. Prevent liquid from entering sewers, watercourses, and soil. In case of contamination of soil or water bodies notify the competent authorities.

6.3. Methods and material for containment and cleaning up

- | | |
|-------------------------|---|
| Methods for 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. |
| Other information | : Dispose of materials or solid residues at an authorized site. |

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

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|-------------------------------|---|
| Precautions for safe handling | : Keep away from sources of ignition. Take precautionary measures (e.g. earthing) against static discharges. Avoid skin contact and inhalation of oil mist. Wear protective equipment when needed. Thoroughly clean contaminated skin and change dirty clothing and equipment. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons). |
| Hygiene measures | : Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product. |

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store locked up. Store in a well-ventilated place. 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 uses are presented in the Annexes of this SDS.

List of Exposure Scenarios:

ES 1 Distribution, use as an intermediate, and/or formulation & (re)packing of renewable diesel

ES 2 Industrial uses of renewable diesel in coatings

ES 3 Professional uses of renewable diesel in coatings

ES 4 Industrial use of renewable diesel as a fuel

ES 5 Professional use of renewable diesel as a fuel.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

Occupational exposure limits for the critical constituents of the substance:

Oil mist: 5 mg/m³ (8 h)

UPM BIOVERNO DIESEL	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	n-Hexane
IOEL TWA	72 mg/m ³
IOEL TWA [ppm]	20 ppm
Remark	(Year of adoption 2010)
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Albania - Occupational Exposure Limits	
Local name	n-Hekzan
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	VENDIM Nr. 522, datë 6.8.2014 PËR MIRATIMIN E RREGULLORES "PËR MBROJTJEN E SIGURISË DHE SHËNETIT TË PUNËMARRËSVE NGA RISQET E LIDHURA ME AGJENTËT KIMIKË NË PUNË"
Austria - Occupational Exposure Limits	
Local name	n-Hexan
MAK (OEL TWA)	72 mg/m ³
MAK (OEL TWA) [ppm]	20 ppm
MAK (OEL STEL)	288 mg/m ³ (4x 15(Miw) min)
MAK (OEL STEL) [ppm]	80 ppm (4x 15(Miw) min)
Remark	Fortpflanzungsgefährdend: f
Regulatory reference	BGBI. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	n-Hexane # n-Hexaan

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830

UPM BIOVERNO DIESEL	
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
OEL STEL	80 mg/m ³
OEL STEL [ppm]	15 ppm
Remark	D: la mention "D" signifie que la résorption de l'agent, via la peau, les muqueuses ou les yeux, constitue une partie importante de l'exposition totale. Cette résorption peut se faire tant par contact direct que par présence de l'agent dans l'air. # D: de vermelding "D" betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Bulgaria - Occupational Exposure Limits	
Local name	n-Хексан
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
OEL STEL	75 mg/m ³
Remark	• (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 47 от 2021 г., в сила от 04.06.2021 г.)
Croatia - Occupational Exposure Limits	
Local name	n-Heksan
GVI (OEL TWA) [1]	72 mg/m ³
GVI (OEL TWA) [2]	20 ppm
Remark	Direktiva: 2006/15/EZ. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граничним vrijednostima izloženosti i biološkim граничним vrijednostima (NN 1/2021)
Croatia - Biological limit values	
Local name	n-Heksan

UPM BIOVERNO DIESEL	
BLV	<p>1.74 µmol/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krv - Vrijeme uzorkovanja: za vrijeme izloženosti</p> <p>0.22 mmol/mol Creatinine Karakteristični pokazatelj: 2-heksanol - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: interferencija istodobne izloženosti metil etil-ketonu</p> <p>0.2 mg/g creatinine Karakteristični pokazatelj: 2-heksanol - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: interferencija istodobne izloženosti metil etil-ketonu</p> <p>5.25 mmol/mol Creatinine Karakteristični pokazatelj: 2,5-heksandion - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: interferencija istodobne izloženosti metil etil-ketonu</p> <p>150 µg/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krv - Vrijeme uzorkovanja: za vrijeme izloženosti</p> <p>1.66 µmol/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti</p> <p>40 ppm Karakteristični pokazatelj: n-heksan - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti</p> <p>5.3 mg/g creatinine Karakteristični pokazatelj: 2,5-heksandion - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: interferencija istodobne izloženosti metil etil-ketonu</p>
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Cyprus - Occupational Exposure Limits	
Local name	n-εξάνιο
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	n-Hexan
PEL (OEL TWA)	70 mg/m ³
PEL (OEL TWA) [ppm]	19.5 ppm
NPK-P (OEL C)	200 mg/m ³
NPK-P (OEL C) [ppm]	56 ppm
Remark	I - dráždí sliznice (oči, dýchací cesty), respektive kůže, D - při expozici se významně uplatňuje pronikání faktoru kůže.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Denmark - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA [1]	72 mg/m ³
OEL TWA [2]	20 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi)
Regulatory reference	BEK nr 2203 af 29. november 2021
Estonia - Occupational Exposure Limits	
Local name	n-heksaan
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm

UPM BIOVERNO DIESEL	
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Finland - Occupational Exposure Limits	
Local name	n-Heksaani
HTP (OEL TWA) [1]	72 mg/m ³
HTP (OEL TWA) [2]	20 ppm
HTP (OEL STEL)	10 mg/m ³
HTP (OEL STEL) [ppm]	2 ppm
Remark	lho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	n-Hexane
VME (OEL TWA)	72 mg/m ³
VME (OEL TWA) [ppm]	20 ppm
Remark	Valeurs réglementaires contraignantes
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 984, 2016; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	n-Hexan
AGW (OEL TWA) [1]	180 mg/m ³
AGW (OEL TWA) [2]	50 ppm
Peak exposure limitation factor	8(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	Hexan (n-Hexan)
Biological limit value	5 mg/l Parameter: 2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon (nach Hydrolyse) - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 05/2013 DFG
Regulatory reference	TRGS 903
Gibraltar - Occupational Exposure Limits	
Local name	n-Hexane
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	Factories (Control of Chemical Agents at Work) Regulations 2003 (LN. 2018/181)
Greece - Occupational Exposure Limits	
Local name	Εξάνιο, n- (n- εξάνιο)
OEL TWA	72 mg/m ³

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830



UPM BIOVERNO DIESEL	
OEL TWA [ppm]	20 ppm
Regulatory reference	Π.Δ. 162/2007 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	n-HEXÁN
AK (OEL TWA)	72 mg/m ³
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat), BEM (biológiai expozíciós mutató); EU2 (2006/15/EK irányelvben közölt érték); T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíció követően jelentkezik)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Hungary - Biological Exposure Indices	
Local name	n-Hexán
BEI	18 μmol/l Biológiai expozíciós (hatás) mutató: 2,5-hexán-dion (hidrolízis után) - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 2 mg/l Biológiai expozíciós (hatás) mutató: 2,5-hexán-dion (hidrolízis után) - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	n-Hexane
OEL TWA [1]	72 mg/m ³
OEL TWA [2]	20 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values), Sk (Substances which have the capacity to penetrate intact skin when they come in contact with it, and be absorbed into the body)
Regulatory reference	Chemical Agents Code of Practice 2021
Ireland - Biological limit values	
Local name	Hexane
BLV	0.4 mg/l Parameter: 2,5-Hexanedion - Medium: urine - Sampling time: End of shift at end of workweek
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	n-Esano
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	Allegato XXXVIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.
Latvia - Occupational Exposure Limits	
Local name	n-Heksāns
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Remark	ļetekme uz dzirdi

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830



UPM BIOVERNO DIESEL	
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2015. gada 7. aprīlī noteikumiem Nr. 163)
Lithuania - Occupational Exposure Limits	
Local name	n-heksanas
IPRV (OEL TWA)	72 mg/m ³
IPRV (OEL TWA) [ppm]	20 ppm
Remark	R (reprodukcijai toksisks poveikis)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	n-Hexane
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	Mémorial A N° 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	n-Hexane
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	S.L.424.24 - Chemical Agents at Work Regulations (L.N.356 of 2021)
Netherlands - Occupational Exposure Limits	
Local name	n-Hexaan
TGG-8u (OEL TWA)	72 mg/m ³
TGG-15min (OEL STEL)	144 mg/m ³
Regulatory reference	Arbeidsomstandighedenregeling 2022
Poland - Occupational Exposure Limits	
Local name	Heksan (n-heksan)
NDS (OEL TWA)	72 mg/m ³
NDSch (OEL STEL)	50 mg/m ³
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	n-Hexano
OEL TWA [ppm]	50 ppm
Remark	P (Toxicidade percutânea); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	n-Hexano
BEI	0.4 mg/l Parâmetro: 2,5-Hexanodiona - Meio: urina - Momento da amostragem: Fim do turno no fim da semana de trabalho - Notação: Sem hidrólise

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830

UPM BIOVERNO DIESEL	
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Remark	R2 - susceptibil de a dăuna fertilității
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
Romania - Biological limit values	
Local name	N-hexan
BLV	5 mg/g creatinine Indicator biologic: 2,5 hexandionă - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 584/2018)
Serbia - Occupational Exposure Limits	
Local name	н-гексан
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Remark	EY** – напомена да се ради о хемијским материјама за које су утврђене индикативне граничне вредности изложености према Директиви 2006/15/E3 (друга листа)
Regulatory reference	ПРАВИЛНИК о превентивним мерама за безбедан и здрав рад при излагању хемијским материјама („Службени гласник РС”, бр. 106/09, 117/17 и 107/21)
Slovakia - Occupational Exposure Limits	
Local name	n-Hexán
NPHV (OEL TWA) [1]	72 mg/m ³
NPHV (OEL TWA) [2]	20 ppm
NPHV (OEL STEL)	140 mg/m ³
NPHV (OEL STEL) [ppm]	40 ppm
Remark	K - znamená, že faktor môže byť ľahko absorbovaný kožou
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Slovakia - Biological limit values	
Local name	n-Hexán
BLV	5 mg/l Zisťovaný faktor: 2,5-Hexándion a 4,5-dihydroxy-2-hexanón - Vyšetrovaný materiál: moč - Čas odberu vzorky: b) koniec expozície alebo pracovnej zmeny
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (Zmena: 471/2011 Z.z.)
Slovenia - Occupational Exposure Limits	
Local name	n-heksan
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
OEL STEL	576 mg/m ³
OEL STEL [ppm]	160 ppm
Remark	Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), BAT (Biološka mejna vrednost), EU

UPM BIOVERNO DIESEL	
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Slovenia - Biological limit values	
Local name	n-heksan
BLV	5 mg/l Parameter: 2,5-heksandion in 4,5-dihidroksi-2-heksanon (po hidrolizi) - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	n-Hexano
VLA-ED (OEL TWA) [1]	72 mg/m ³
VLA-ED (OEL TWA) [2]	20 ppm
VLA-EC (OEL STEL)	80 mg/m ³
VLA-EC (OEL STEL) [ppm]	15 ppm
Remark	VLB® (Agente químico que tiene Valor Límite Biológico), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT
Spain - Biological limit values	
Local name	n-Hexano
BLV	0.2 mg/l Parámetro: 2,5-Hexanodiona - Medio: Orina - Momento de muestreo: Final de la semana laboral - Notas: Sin hidrólisis
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2022. INSHT
Sweden - Occupational Exposure Limits	
Local name	n-Hexan
NGV (OEL TWA)	72 mg/m ³
NGV (OEL TWA) [ppm]	20 ppm
KTV (OEL STEL)	180 mg/m ³
KTV (OEL STEL) [ppm]	50 ppm
Remark	V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	n-Hexane
WEL TWA (OEL TWA) [1]	72 mg/m ³
WEL TWA (OEL TWA) [2]	20 ppm
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)

UPM BIOVERNO DIESEL	
Norway - Occupational Exposure Limits	
Local name	n-heksan
Grenseverdi (OEL TWA) [1]	72 mg/m ³
Grenseverdi (OEL TWA) [2]	20 ppm
Remark	R: Kjemikalier som skal betraktes som reproduksjonstoksiske; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
Regulatory reference	FOR-2021-06-28-2248
North Macedonia - Occupational Exposure Limits	
Local name	n-хексан
OEL TWA	72 mg/m ³
OEL TWA [ppm]	20 ppm
Remark	(*) дополнување на граничната вредност заради донесената Директива на Комисијата 2006/15ES од 7 февруари 2006 за создавање на втора листа на индикативни гранични вредности за професионална изложеност според директивата 98/24/EC и за измените на директивата 91/322/EEC и директивата 2000/39/ EC (Сл. весник бр. 38 од ден 9.2.2006, стр. 36); (BAT) биолошка гранична вредност – праг на биолошка гранична вредност, што значи предупредување на опасна хемиска супстанца и нејзини метаболити во ткивата, телесните течности или издишувањето на воздухот, без оглед на тоа, дали опасната хемиска супстанца е внесена во организмот со вдишување, голтање или преку кожата; (EU) European Union – гранична вредност, определена на ниво на Европската унија
Regulatory reference	Правилник за минималните барања за безбедност и здравје при работа на вработени од ризици поврзани со изложување на хемиски супстанции („Службен весник на Република Македонија“ бр.46/10)
Switzerland - Occupational Exposure Limits	
Local name	n-Hexane / n-Hexan
MAK (OEL TWA) [1]	180 mg/m ³
MAK (OEL TWA) [2]	50 ppm
KZGW (OEL STEL)	1440 mg/m ³
KZGW (OEL STEL) [ppm]	400 ppm
Critical toxicity	Yeux, SN / Auge, NS
Notation	R, R _{2F} , SS _C , B / H, R _{2F} , SS _C , B
Remark	NIOSH
Regulatory reference	www.suva.ch, 28.03.2022
Switzerland - BAT	
Local name	n-Hexane / n-Hexan
BAT	5 mg/l (Paramètre biologique: 2,5-Hexanedione + 4,5-Dihydroxy-2-hexanone; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (Biologischer Parameter: 2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.)
Remark	Paramètre non spécifique. / Nicht spezifischer Parameter.
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

UPM BIOVERNO DIESEL	
DNEL/DMEL (Workers)	
Acute - local effects, dermal	Low hazard is assigned since the substance is a skin irritant. The appropriate RMMS to protect skin contact need to be worn (See section 8.2 and Annex)
Long-term - systemic effects, dermal	1.3 mg/kg bodyweight/day (NOAEL: 400 mg/kg bw/day based on AF of 300). The DNEL is derived from the subacute dermal animal study conducted for the similar fossil fuels.
Long-term - systemic effects, inhalation	9.4 mg/m ³ NOAEC: 705.26 mg/m ³ based on AF of 75). The DNEL is derived from the subacute dermal animal study conducted for the similar fossil fuels.
DNEL/DMEL (General population)	
Long-term - systemic effects, oral	0.67 mg/kg bodyweight/day NOAEL: 400 mg/kg/day, based on AF of 600). The DNEL is derived from the chronic dermal animal study conducted for the similar fossil fuels.
Long-term - systemic effects, inhalation	7.02 mg/m ³ (NOAEC: 1052.63 mg/m ³ , based on AF of 150). The DNEL is derived from the subacute dermal animal study conducted for the similar fossil fuels.
Long-term - systemic effects, dermal	0.67 mg/kg bodyweight/day (NOAEL: 400 mg/kg bw/day, based on AF of 600). The DNEL is derived from the subacute dermal animal study conducted for the similar fossil fuels.
PNEC (Water)	
PNEC aqua (freshwater)	0.56 – 770 µg/L The overall range (all representative components of the substance) estimated with the PETRORISK tool.
PNEC aqua (marine water)	0.56 – 770 µg/L The overall range (all representative components of the substance) estimated with the PETRORISK tool.
PNEC (Sediment)	
PNEC sediment (freshwater)	0.29 – 73000 mg/kg wet weight The overall range (all representative components of the substance) estimated with the PETRORISK tool.
PNEC sediment (marine water)	0.29 – 73000 mg/kg wet weight The overall range (all representative components of the substance) estimated with the PETRORISK tool.
PNEC (Soil)	
PNEC soil	0.12 – 29000 mg/kg wet weight The overall range (all representative components of the substance) estimated with the PETRORISK tool.
PNEC (STP)	
PNEC sewage treatment plant	8.4 – 12000 µg/L The overall range (all representative components of the substance) estimated with the PETRORISK tool.

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Containment: In case of enclosure and automatic processes no other containment required. Handle the product in closed systems or provide sufficient ventilation. During tank operations follow special instructions (see annexes).

Local exhaust ventilation: Provide local exhaust ventilation for points of potential exposure

General ventilation: Provide good general ventilation (3 – 5 air changes per hour).

8.2.2. Personal protection equipment

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Safety glasses with side shields

Eye protection			
Type	Field of application	Characteristics	Standard
Safety goggles, Safety glasses			EN 166

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable protective clothing. Use additional protection (face shield, full skin coverage) for activities with significant potential of exposure (see annexes).

Hand protection:

Protective gloves

Hand protection					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Protective gloves					EN ISO 374

8.2.2.3. Respiratory protection

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment. Substance/task appropriate respirator for points of potential exposure.

Wear a respirator or half face mask. Select combined filter suitable for organic gases and vapours, solid and liquid particles, filter type A2-P3. If filter respirators are unsuitable for the conditions (e.g. high concentration levels, low oxygen level or confined space), use compressed-air or fresh-air breathing apparatus. Filter must be replaced frequently enough.

Respiratory protection			
Device	Filter type	Condition	Standard
Reusable half mask	ABEK-P3		

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

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).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear, colorless liquid.
Colour	: Colourless.
Odour	: characteristic.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point/ Freezing point	: <0 °C (can be adjusted)
Boiling point	: 150 – 370 °C at 101.3 kPa (EN ISO 3405)
Flash point	: >60 °C at 101.3 kPa (EN ISO 2719)
Auto-ignition temperature	: ca. 220 °C at 101.3 kPa (EU A.15)
Decomposition temperature	: No data available
Flammability (solid, gas)	: Non flammable.
Vapour pressure	: <0.1 kPa Temp.: 37,8 °C (DIN EN 13016 -1)
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: 800 – 830 kg/m³ Temp.: 15 °C
Solubility	: Water: 1 mg/l at 25°C (EU A.8)
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: 6 at 22 °C (EU A.8)
Viscosity, kinematic	: ≤ 4.5 mm²/s at (40 °C) (DIN EN ISO 3104)
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive.
Oxidising properties	: Not oxidising.
Lower explosive limit (LEL)	: Not known.
Upper explosive limit (UEL)	: Not known.

9.2. Other information

Adsorption coefficient (log Koc)	: The overall range (all components) for the estimated log Koc values is from 2.31 to 9.53 (PETRORISK modelling).
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SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Thermal decomposition and burning may produce irritating or toxic fumes.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

UPM BIOVERNO DIESEL

LD50 oral rat	> 2000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 420 (Acute Oral Toxicity - Fixed Dose Method), Guideline: EU Method B.1 bis (Acute Oral Toxicity - Fixed Dose Procedure)
LD50 dermal rat	400000 mg/kg bodyweight (animals were exposed to similar fossil fuels, equivalent or similar to OECD 402)
LD50 inhalation mouse	23400 mg/m ³ (8-hour exposure; volatile constituent in the substance; nonane)

Skin corrosion/irritation	: The substance is irritating to skin based on the in vivo study (rabbits were exposed to similar fossil fuels, equivalent or similar to OECD 405).
Serious eye damage/irritation	: The substance is not irritating to eyes based on the in vitro data (SkinEthic HCE model, corneal epithelium, GLP) and in vivo data (rabbits were exposed to similar fossil fuels, equivalent or similar to OECD 405).
Respiratory or skin sensitisation	: Not sensitising based on the Guinea Pig Maximisation Test (GPMT) (OECD 406).
Germ cell mutagenicity	: Genetic toxicity: In vitro (bacterial mutation assay, OECD Guideline 471) and in vivo (chromosome aberration assay, rat, OECD Guideline 475) studies: negative.
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: This substance has not been classified for STOT SE.
STOT-repeated exposure	: No systemic effects after repeated exposure were observed based on the data from similar fossil fuel
Aspiration hazard	: Substance is classified as Asp. Tox 1 (H304). Aspiration hazard, aspiration may cause pulmonary oedema and pneumonitis.

UPM BIOVERNO DIESEL

Viscosity, kinematic	≤ 4.5 mm ² /s at (40 °C) (DIN EN ISO 3104)
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11.2. Information on other hazards

No additional information available

12.1. Toxicity

Ecology - general	: Harmful to aquatic life with long lasting effects.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Harmful to aquatic life with long lasting effects.
Not rapidly degradable	

UPM BIOVERNO DIESEL

LC50 - Fish [1]	21 mg/l LL50 (mortality, Oncorhynchus mykiss) 21 mg/l; OECD 203; GLP;
EC50 - Crustacea [1]	68 mg/l EL50 (immobilization, Daphnia magna) OECD 202; GLP;
EC50 72h - Algae [1]	> 100 mg/l EL50 (growth rate, Desmodesmus subspicatus) OECD 201;
Toxicity to activated sludge respiration	EL10 (3h): 39.25 mg/l (OECD 209; GLP)

12.2. Persistence and degradability

UPM BIOVERNO DIESEL	
Persistence and degradability	Screening tests based on OECD guidelines 301 B and 301F of this product indicated that this product is not readily biodegradable: 31 % degradation of test substance (solvent neutral 600 base oil) after 28 d (O ₂ consumption). Biodegradation for this complex hydrocarbon UVCB-substance is based on the test results of different petroleum products and modelling of hydrocarbon blocks using PETRORISK model (CONCAWE).

12.3. Bioaccumulative potential

UPM BIOVERNO DIESEL	
Partition coefficient n-octanol/water (Log K _{ow})	6 at 22 °C (EU A.8)
Bioaccumulative potential	<p>C9-14 Aliphatics (≤2% aromatic) category using the PETRORISK model. The predicted BCFs for hydrocarbons are generally overly conservative since biotransformation is not quantitatively taken into account. Therefore, indirect exposure and resulting risk estimates predicted by PETRORISK are likely to be overestimated. For the purposes of PBT assessment, measured bioaccumulation data for representative hydrocarbon constituents including the substance have been used. The QSAR used to calculate the BCF of C9-14 Aliphatics (≤2% aromatics) followed the Reach guidance indications (R7.10.3.2) and so is deemed suitable for the assessment of bioconcentration. The calculated BCF of decane is 144.3 L/kg. This value indicates that decane is not to be considered as a bioaccumulable substance.</p> <p>The calculated BCF of undecane is 337.8 L/kg. This value indicates that undecane is not to be considered as a bioaccumulable substance. The calculated BCF of 790.9 L/kg indicates that dodecane does not belong to bioaccumulable substances. The calculated BCF of tetradecane is 962.9 L/kg. This value indicates that tetradecane is not to be considered as a bioaccumulable substance.</p>

12.4. Mobility in soil

UPM BIOVERNO DIESEL	
Additional information	Based on low water solubility and high 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. 88.7 %). Fractions distributed to other environmental compartments is expected to be low; sediment (6.2 %), soil (3.2 %), water (1.9 %).

12.5. Results of PBT and vPvB assessment

UPM BIOVERNO DIESEL	
Not classified as PBT or vPvB.	
Results of PBT assessment	<p>Persistent: Based on the biodegradation potential estimated with BIOWIN model, the substance is classified as persistent (P).</p> <p>Bioaccumulation: Based on test results from the octanol-water partitioning coefficient study (log K_{ow} of 6) the substance might contain substances having potential for bioaccumulation. However, the estimated log BCF value for the ten most abundant individual structures of the substance ranged from 1.98 to 3.18 (BCF 95 to 1514 L/kg). Because the estimated BCF values are less than B or vB criteria (2000 and 5000 L/kg), this substance is concluded as not B or vB.</p> <p>Toxic: Based on the aquatic toxicity test results of the substance and the results of long-term toxicological studies with surrogate material, this substance is not fulfilling the criteria as toxic (T).</p> <p>Overall conclusion: The criteria for PBT or vPvB are not met.</p>
Results of vPvB assessment	Overall conclusions: The criteria for vPvB are not met.

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties

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

12.7. Other adverse effects

Other adverse effects

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

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods

: Dispose of contents/container in accordance with licensed collector's sorting instructions. 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. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste legislation and any local waste management regulations.

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 municipal sewers.

Waste from residues / unused products:

Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities. All wastes containing residues of the substance or its hazardous degradation products shall be classified as hazardous waste.

Proposed suitable waste codes:

16 03 05* off-specification batches and unused products; organic wastes 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.






UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830


SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
UN 1202	UN 1202	UN 1202	UN 1202	UN 1202
14.2. UN proper shipping name				
DIESEL FUEL	DIESEL FUEL	Diesel fuel	DIESEL FUEL	DIESEL FUEL
Transport document description				
UN 1202 DIESEL FUEL, 3, III, (D/E)	UN 1202 DIESEL FUEL, 3, III	UN 1202 Diesel fuel, 3, III	UN 1202 DIESEL FUEL, 3, III	UN 1202 DIESEL FUEL, 3, III
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
III	III	III	III	III
14.5. Environmental hazards				
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR)	: F1
Special provisions (ADR)	: 640M, 664
Limited quantities (ADR)	: 5I
Excepted quantities (ADR)	: E1
Packing instructions (ADR)	: P001, IBC03, LP01, R001
Mixed packing provisions (ADR)	: MP19
Portable tank and bulk container instructions (ADR)	: T2
Portable tank and bulk container special provisions (ADR)	: TP1
Tank code (ADR)	: LGBV
Vehicle for tank carriage	: AT
Transport category (ADR)	: 3
Special provisions for carriage - Packages (ADR)	: V12
Hazard identification number (Kemler No.)	: 30
Orange plates	: 

Tunnel restriction code (ADR)	: D/E
EAC code	: 3Y

Transport by sea

Special provisions (IMDG)	: 363
Limited quantities (IMDG)	: 5 L
Excepted quantities (IMDG)	: E1

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830

Packing instructions (IMDG)	: P001, LP01
IBC packing instructions (IMDG)	: IBC03
Tank instructions (IMDG)	: T2
Tank special provisions (IMDG)	: TP1
EmS-No. (Fire)	: F-E
EmS-No. (Spillage)	: S-E
Stowage category (IMDG)	: A
Properties and observations (IMDG)	: Immiscible with water.

Air transport

PCA Excepted quantities (IATA)	: E1
PCA Limited quantities (IATA)	: Y344
PCA limited quantity max net quantity (IATA)	: 10L
PCA packing instructions (IATA)	: 355
PCA max net quantity (IATA)	: 60L
CAO packing instructions (IATA)	: 366
CAO max net quantity (IATA)	: 220L
Special provisions (IATA)	: A3
ERG code (IATA)	: 3L

Inland waterway transport

Classification code (ADN)	: F1
Special provisions (ADN)	: 640K
Limited quantities (ADN)	: 5 L
Excepted quantities (ADN)	: E1
Carriage permitted (ADN)	: T
Equipment required (ADN)	: PP, EX, A
Ventilation (ADN)	: VE01
Number of blue cones/lights (ADN)	: 0

Rail transport

Classification code (RID)	: F1
Special provisions (RID)	: 640K
Limited quantities (RID)	: 5L
Excepted quantities (RID)	: E1
Packing instructions (RID)	: P001, IBC03, LP01, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T2
Portable tank and bulk container special provisions (RID)	: TP1
Tank codes for RID tanks (RID)	: LGBF
Transport category (RID)	: 3
Special provisions for carriage – Packages (RID)	: W12
Colis express (express parcels) (RID)	: CE4
Hazard identification number (RID)	: 30

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

Transport in Bulk (MARPOL 73/78, Annex I): Energy-rich fuels. Alkanes (C9-C24) linear, branched and cyclic. Renewable hydrocarbons of wood origin (diesel type fraction) (Flashpoint >60°C): 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

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

EU restriction list (REACH Annex XVII)		
Reference code	Applicable on	Entry title or description
3(c)	UPM BIOVERNO DIESEL	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 1005/2009)

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.1.2. National regulations

Germany

Employment restrictions

: Observe restrictions according Act on the Protection of Working Mothers (MuSchG).
Observe restrictions according Act on the Protection of Young People in Employment (JArbSchG).

Water hazard class (WGK)

: WGK 1, Slightly hazardous to water.

Storage class (LGK, TRGS 510)

: LGK 3 - Flammable liquids.

Joint storage table

LGK 1	LGK 2A	LGK 2B	LGK 3	LGK 4.1A
LGK 4.1B	LGK 4.2	LGK 4.3	LGK 5.1A	LGK 5.1B
LGK 5.1C	LGK 5.2	LGK 6.1A	LGK 6.1B	LGK 6.1C
LGK 6.1D	LGK 6.2	LGK 7	LGK 8A	LGK 8B
LGK 10	LGK 11	LGK 12	LGK 13	LGK 10-13

Joint storage not permitted for

: LGK 1, LGK 2A, LGK 4.1A, LGK 4.1B, LGK 4.2, LGK 4.3, LGK 5.1A, LGK 5.1C, LGK 5.2, LGK 6.1B, LGK 6.2, LGK 7.

Joint storage with restrictions permitted for

: LGK 5.1B, LGK 6.1D, LGK 11, LGK 10-13.

Joint storage permitted for

: LGK 2B, LGK 3, LGK 6.1A, LGK 6.1C, LGK 8A, LGK 8B, LGK 10, LGK 12, LGK 13.

Hazardous Incident Ordinance (12. BImSchV)

: Is not subject of the Hazardous Incident Ordinance (12. BImSchV)

Netherlands

ABM category

: A(3) - hazardous for aquatic organisms, may have longterm hazardous effects in aquatic environment

SZW-lijst van kankerverwekkende stoffen

: The substance is not listed

SZW-lijst van mutagene stoffen

: The substance is not listed

SZW-lijst van reprotoxische stoffen – Borstvoeding

: The substance is not listed

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830

SZW-lijst van reprotoxische stoffen – : The substance is not listed
 Vruchtbaarheid
 SZW-lijst van reprotoxische stoffen – Ontwikkeling : The substance is not listed

Denmark

Class for fire hazard : Class III-1
 Store unit : 50 liter
 Classification remarks : Flammable according to the Danish Ministry of Justice; Emergency management guidelines for the storage of flammable liquids must be followed
 Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

Switzerland

Storage class (LK) : LK 3 - Flammable liquids

15.2. Chemical safety assessment

For this substance a chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:

Version 6.0: Update to comply with Commission Regulation (EU) 2020/878.

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EL50	Loading rate of the substance that causes 50 % reduction of a certain effect on test organisms
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LL50	Loading rate of the substance that causes 50 % mortality of the test population
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development

Abbreviations and acronyms:

OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Full text of H- and EUH-statements:

Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H412	Harmful to aquatic life with long lasting effects.
Skin Irrit. 2	Skin corrosion/irritation, Category 2

The classification complies with : ATP 12

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Issue date: 3/25/202019 Revision date: 13/1/2022 Version: 6.0



Annex to extended Safety Data Sheet

Table of Contents

SDS-ES Nro	CSR-ES Nro	Exposure scenario (ES) name	Page
1	ES2 ES3 ES4	Distribution, use as an intermediate, and/or formulation & (re)packing of renewable diesel	27
2	ES5	Industrial uses of renewable diesel in coatings	34
3	ES6	Professional uses of renewable diesel in coatings	41
4	ES7	Industrial use of renewable diesel as a fuel	48
5	ES8	Professional use of renewable diesel as a fuel	54

1: Distribution, use as an intermediate, and/or formulation & (re)packing of renewable diesel

1. Title of Exposure scenario	
Free text title: Distribution of renewable diesel ("Distribution") Industrial use of renewable diesel as an intermediate ("Intermediate") Formulation (&re-packaging) of renewable diesel ("Formulation")	CSR-ES 2 CSR-ES 3 CSR-ES 4
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 Intermediate: ESVOC SPERC 6.1a.v1 Use as an Intermediate (industrial): solvent-borne Formulation: ESVOC SPERC 2.2.v1 Formulation and (re)packing of substances and mixtures (industrial): solvent-borne	ESVOC SPERC 1.1b.v1 ESVOC SPERC 6.1a.v1 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, bulk transfers	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
General process exposures - batch process with exposure	PROC 4
Mixing operations (open systems) (Formulation)	PROC 5
Drum and small package filling (Distribution, Formulation)	PROC 9
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14
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 (diesel 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 modelling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	6.3E-10 - 510 mg/L (experimental test result for the substance: 1 mg/L)
Log Henry's Law Constants	-6.08 – 2.65 (atm·m ³ /mol)
Log Kow	2.55 – 13.23 (experimental test result for the substance: 6)
Log Koc	2.31 – 9.53
Half-life – Air	0.64 – 40 h
Half-life – Water	3.7 – 7300 d
Half-life – Soil	3.7 – 7300 d

Half-life – Sediment	15 – 29000 d			
Half-life – Wastewater	0.46 – 2300 h			
Amounts used				
Annual use at a site:	Distribution: ≤ 200 tonnes/year Intermediate: ≤ 100 000 tonnes/year Formulation: ≤ 10 000 tonnes/year			
Daily use at a site:	Distribution: ≤ 0.667 tonnes/day (SPERC default emission days 300 d/year) Intermediate: ≤ 333 tonnes/day (SPERC default emission days 300 d/year) Formulation: ≤ 33 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. via oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances.			
	Emission factor	Distribution	Intermediate	Formulation
	water	0.0001 %	0.003 %	0.002 %
	air (final)	0.001 %	0.002 %	0.5 %
soil	0.001 %	0.1 %	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.				
Conditions and measures related to municipal sewage treatment plant				

Municipal STP (off-site):	Yes (effectiveness 80 %). (<i>alternatively treatment at an on-site WWTP</i>)			
Discharge rate of effluent	2000 m³/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 16 08 02* 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: 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 and aspiration toxicity effects.				
Physical form:	liquid			
Molecular weight:	205 g/mol (average molecular weight based on analytical substance identification data)			
Vapour pressure:	100 Pa at 37 °C (test result: Vp < 0.1 kPa) 10 001 Pa at > 40 °C (model default value for elevated temperature)			
Concentration of substance in product:	As such (100 %)			
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, bulk transfers	PROC 8b	< 4 h	Outdoor	≤ 40 °C
General process exposures - closed process (no sampling)	PROC 1	< 8 h	Indoor	1. ≤ 40 °C 2. > 40 °C
General process exposures - closed continuous process (with sampling)	PROC 2	< 8 h	Indoor	1. ≤ 40 °C 2. > 40 °C
General process exposures - closed batch process (with sampling)	PROC 3	< 8 h	Indoor	≤ 40 °C
General process exposures - batch process with exposure	PROC 4	< 8 h	Indoor	≤ 40 °C
Mixing operations (open systems) (Formulation)	PROC 5	< 8 h	Indoor	≤ 40 °C

Drum and small package filling (Distribution, Formulation)	PROC 9	< 8 h	Indoor	≤ 40 °C
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14	< 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		
Equipment cleaning and maintenance – indoor/outdoor	PROC 8a	No containment		
Bulk loading and unloading, bulk transfers	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		
General process exposures - batch process with exposure	PROC 4	Semi-closed process with occasional controlled exposure		
Mixing operations (open systems) (Formulation)	PROC 5	No containment		
Drum and small package filling (Distribution, Formulation)	PROC 9	Semi-closed process with occasional controlled exposure		
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14	No containment		
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	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h: LEV or SOP (eg. drain down prior to maintenance)</i>	Good (3-5 air changes per hour)	
Equipment cleaning and maintenance - outdoor	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h: LEV or SOP (eg. drain down prior to maintenance)</i>	not applicable	
Bulk loading and unloading, bulk transfers	PROC 8b	No (0 %)	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	1. No (0 %) $T \leq 40^{\circ}\text{C}$ 2. Yes (90 %) $T > 40^{\circ}\text{C}$: <i>LEV / closed or semi-closed sampling points</i>	Good (3-5 air changes per hour)*	
General process exposures - closed batch process (with sampling)	PROC 3	No (0 %)	Good (3-5 air changes per hour)*	
General process exposures - batch process with exposure	PROC 4	No (0 %)	Good (3-5 air changes per hour)*	
Mixing operations (open systems) (Formulation)	PROC 5	Yes (90 %): <i>LEV to points where emission occur</i>	Good (3-5 air changes per hour)	
Drum and small package filling (Distribution, Formulation)	PROC 9	No (0 %)	Good (3-5 air changes per hour)*	
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14	No (0 %)	Good (3-5 air changes per hour)	
Laboratory activities	PROC 15	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: %)	Dermal protection	Eye/face protection:
Equipment cleaning and maintenance – indoor / outdoor	PROC 8a	Yes (90 %)	Yes (95 %)	Eye protection: Goggles or safety glasses with side shields (EN166)
Bulk loading and unloading, bulk transfers	PROC 8b	Yes (90 %)	Yes (95 %)	
General process exposures - closed process (no sampling)	PROC 1	No (0 %)	No (0 %)	Eye protection where there is potential for exposure. (PROC1: good practice advice, see below)
General process exposures - closed continuous process (with sampling)	PROC 2	No (0 %)	Yes (95 %)	
General process exposures - closed batch process (with sampling)	PROC 3	Yes (90 %) (Or provide LEV)	Yes (95 %)	
General process exposures - batch process with exposure	PROC 4	Yes (90 %) (Or provide LEV)	Yes (95 %)	
Mixing operations (open systems) (Formulation)	PROC 5	No (0 %)	Yes (95 %)	
Drum and small package filling (Distribution, Formulation)	PROC 9	Yes (90 %)	Yes (95 %)	
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14	Yes (90 %)	Yes (95 %)	
Laboratory activities	PROC 15	No (0 %)	Yes (95 %)	
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: $PNEC_{wastewater} = 8.4 \mu\text{g/L}$ to $12\,000 \mu\text{g/L}$, $PNEC_{aquatic} = 0.56 \mu\text{g/L}$ to $770 \mu\text{g/L}$, $PNEC_{soil} = 0.12 \text{ mg/kg ww}$ to $29\,000 \text{ mg/kg ww}$, $PNEC_{sediment} = 0.29 \text{ mg/kg ww}$ to $73\,000 \text{ mg/kg ww}$. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

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

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)	1.5E-05	2.3E-01	5.3E-02
PEC freshwater (mg/L)	1.5E-06 - 5.8E-05	2.3E-02	5.3E-03
PEC marine (mg/L)	1.5E-07 - 3.6E-07	2.3E-03	5.3E-04
PEC freshwater sediment (mg/kg ww)	5.6E-05 - 8.3E-04	8.3E-01	1.9E-01
PEC marine sediment (mg/kg ww)	5.6E-06	8.3E-02	1.9E-02
PEC agricultural soil (mg/kg ww)	4.9E-07 - 1.5E-05	2.0E-05	3.9E-03
Environmental Risk			
RCR effluent	2.0E-05	3.0E-01	7.1E-02
RCR freshwater	3.0E-05 - 1.5E-03	4.5E-01	1.1E-01
RCR marine	3.0E-06 - 9.2E-06	4.5E-02	1.1E-02
RCR freshwater sediment	3.4E-05 - 6.0E-04	5.1E-01	1.2E-01
RCR marine sediment	3.4E-06	5.1E-02	1.2E-02
RCR agricultural soil	1.4E-07 - 3.8E-06	4.4E-05	1.2E-02

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 < 0.0001 to 0.07).

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. DNEL (inhalation) = 9.4 mg/m^3 , DNEL (dermal) = 1.3 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 / outdoor	1. PROC 8a (duration $< 1 \text{ h}$, no LEV)	1.19	0.127	0.685	0.527	0.654
	2. PROC 8a (duration $< 8 \text{ h}$, LEV)	0.597	0.063	0.685	0.527	0.590
Bulk loading and unloading, bulk transfers	PROC 8b	1.79	0.179	0.685	0.527	0.718
General process exposures - closed process (no sampling)	1. PROC 1 ($T \leq 40 \text{ }^\circ\text{C}$)	0.06	0.001	0.007	0.001	0.01
	2. PROC 1 ($T > 40 \text{ }^\circ\text{C}$)	0.06	0.001	0.007	0.001	0.01

General process exposures - closed continuous process (with sampling)	1. PROC 2 (T ≤ 40 °C, no LEV) 2. PROC 2 (T > 40 °C, LEV)	5.97 1.49	0.636 0.159	0.274 0.274	0.210 0.210	0.846 0.369
General process exposures - closed batch process (with sampling)	PROC 3	1.79	0.190	0.138	0.106	0.297
General process exposures - batch process with exposure	PROC 4	2.99	0.318	0.343	0.263	0.581
Mixing operations (open systems) (Formulation)	PROC 5	2.99	0.318	0.685	0.527	0.845
Drum and small package filling (Distribution, Formulation)	PROC 9	2.99	0.318	0.343	0.263	0.263
Tabletting, compression, extrusion or pelletisation (Formulation)	PROC 14	2.99	0.318	0.686	0.527	0.845
Laboratory activities	PROC 15	2.99	0.318	0.068	0.052	0.370

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. 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.

This exposure scenario does not address consumers or professional workers.

2: Industrial uses of renewable diesel in coatings

1. Title of Exposure scenario	
Free text title: Industrial uses of renewable diesel in coatings	CSR-ES 5
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 (and cleaning and maintenance)	PROC 8a
Bulk transfers, material transfers	PROC 8b
Preparation of material for application. Mixing operations (open systems).	PROC 5
General process exposures - closed process	PROC 1
Film formation - force drying	PROC 2
Film formation - air drying	PROC 4
Spraying (manual / automatic)	PROC 7
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9
Roller, spreader, flow application	PROC 10
Dipping, immersion and pouring	PROC 13
Production of preparations or articles by tableting, compression, extrusion, pelletisation.	PROC 14
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 (diesel 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 modelling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	6.3E-10 - 510 mg/L (experimental test result for the substance: 1 mg/L)
Log Henry's Law Constants	-6.08 – 2.65 (atm·m ³ /mol)
Log Kow	2.55 – 13.23 (experimental test result for the substance: 6)
Log Koc	2.31 – 9.53
Half-life - Air	0.64 – 40 h
Half-life – Water	3.7 – 7300 d
Half-life – Soil	3.7 – 7300 d
Half-life – Sediment	15 – 29000 d
Half-life - Wastewater	0.46 – 2300 h
Amounts used	
Annual use at a site:	≤ 10 000 tonnes/year
Daily use at a site:	≤ 33 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									
<p>The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.</p> <p>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.</p>									
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	<p>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.</p> <p>Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. via oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances.</p> <table border="1"> <thead> <tr> <th>Environmental compartment</th><th>Emission factor</th></tr> </thead> <tbody> <tr> <td>water</td><td>0.007 %</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	0.007 %	air (final)	9.8 %	soil	0 %
Environmental compartment	Emission factor								
water	0.007 %								
air (final)	9.8 %								
soil	0 %								
Technical measures to reduce releases to air	<p>Assumed air treatment efficiency: 90 %</p> <p>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 %)</p>								
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									
<p>Environmental, health and safety guidelines or written instructions on the standard operating procedure (SOP) are utilized.</p> <p>Environment, health and safety (EHS) responsibilities are defined and assigned in writing.</p> <p>Emergency action plans (Rescue training for accidental emissions) are created.</p> <p>Personnel are trained in environment, health and safety issues, i.e. in safe handling of chemicals and good housekeeping.</p> <p>General good hygiene and housekeeping.</p>									
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									
<p>Suitable waste codes:</p> <p>08 01 11* Waste paint and varnish containing organic solvents or other dangerous substances</p> <p>08 01 13* Sludges from paint or varnish containing organic solvents or other dangerous substances</p> <p>08 01 19* Aqueous sludges containing paint or varnish containing organic solvents or other dangerous substances</p> <p>08 01 21* Waste paint or varnish remover</p> <p>08 03 12* Waste ink containing dangerous substances</p> <p>08 03 14* Ink sludges containing dangerous substances</p> <p>08 03 17* Waste printing toner containing dangerous substances</p> <p>15 01 10* Packaging containing residues of or contaminated by dangerous substances</p> <p>15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances</p>									

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:

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 and aspiration toxicity.

Physical form:	liquid
Molecular weight:	205 g/mol (average molecular weight based on analytical substance identification data)
Vapour pressure:	100 Pa at 37 °C (test result: Vp < 0.1 kPa) 10 001 Pa at > 40 °C (model default value for elevated temperature)
Concentration of substance in product:	as such (100 %) / > 25 % (up to 100 %) in the mixture

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 (and cleaning and maintenance)	PROC 8a	1. < 1 h 2. < 8 h	Indoor	≤ 40 °C
Bulk transfers, material transfers	PROC 8b	< 4 h	Indoor	≤ 40 °C
Preparation of material for application. Mixing operations (open systems).	PROC 5	< 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
Film formation - air drying	PROC 4	< 8 h	Indoor	≤ 40 °C
Spraying (manual / automatic)	PROC 7	< 8 h	Indoor	≤ 40 °C
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9	< 8 h	Indoor	≤ 40 °C
Roller, spreader, flow application	PROC 10	< 8 h	Indoor	≤ 40 °C
Dipping, immersion and pouring	PROC 13	< 8 h	Indoor	≤ 40 °C
Production of preparations by tabletting, compression, extrusion, pelletisation.	PROC 14	< 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 (and cleaning and maintenance)	PROC 8a	No containment
Bulk transfers, material transfers	PROC 8b	Semi-closed process with occasional controlled exposure
Preparation of material for application. Mixing operations (open systems).	PROC 5	No containment
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
Film formation - air drying	PROC 4	Semi-closed process with occasional controlled exposure

Spraying (manual / automatic)	PROC 7	No containment	
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9	Semi-closed process with occasional controlled exposure	
Roller, spreader, flow application	PROC 10	No containment	
Dipping, immersion and pouring	PROC 13	No containment	
Production of preparations by tableting, compression, extrusion, pelletisation.	PROC 14	No containment	
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 (and cleaning and maintenance)	PROC 8a	1. No (0 %) <i>duration < 1 h</i> 2. Yes (90 %) <i>duration < 8 h: LEV or SOP</i> (eg. <i>drain down prior to maintenance</i>)	Good (3-5 air changes per hour)
Bulk transfers, material transfers	PROC 8b	No (0 %)	Good (3-5 air changes per hour)
Preparation of material for application. Mixing operations (open systems).	PROC 5	No (0 %)	Good (3-5 air changes per hour)
General process exposures - closed process	PROC 1	No (0 %)	Good (3-5 air changes per hour)
Film formation - force drying	PROC 2	Yes (90 %): <i>LEV</i>	Good (3-5 air changes per hour)
Film formation - air drying	PROC 4	No (0 %)	Good (3-5 air changes per hour)
Spraying (manual / automatic)	PROC 7	Yes (95 %): <i>LEV (dermal 90 %)</i>	Good (3-5 air changes per hour)
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9	No (0 %)	Good (3-5 air changes per hour)
Roller, spreader, flow application	PROC 10	Yes (90 %): <i>LEV (dermal 90 %)</i>	Good (3-5 air changes per hour)
Dipping, immersion and pouring	PROC 13	Yes (90 %): <i>LEV</i>	Good (3-5 air changes per hour)
Production of preparations by tableting, compression, extrusion, pelletisation.	PROC 14	No (0 %)	Good (3-5 air changes per hour)
Laboratory activities	PROC 15	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 (gloves conforming to EN374) [Eff. Dermal: %]
Transfer from/pouring from containers, manual (and cleaning and maintenance)	PROC 8a	Yes (90 %)	Eye protection: Goggles or safety glasses with side shields (EN166) Yes (95%)
Bulk transfers, material transfers	PROC 8b	Yes (90 %)	Yes (95%)
Preparation of material for application. Mixing operations (open systems).	PROC 5	Yes (90 %)	<i>Eye protection where there is potential for exposure.</i> Yes (95%)
General process exposures - closed process	PROC 1	No (0 %)	(PROC1: good practice advice, see below) Yes (80%)
Film formation - force drying	PROC 2	No (0 %)	Yes (80%)
Film formation - air drying	PROC 4	Yes (90 %) (or LEV)	Yes (95%)
Spraying (manual / automatic)	PROC 7	Yes (90 %) (or LEV)	Yes (95%)
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9	Yes (90 %) (or LEV)	Yes (95%)
Roller, spreader, flow application	PROC 10	No (0 %)	Yes (90%)
Dipping, immersion and pouring	PROC 13	No (0 %)	Yes (90%)
Production of preparations by tableting, compression, extrusion, pelletisation.	PROC 14	Yes (90 %) (or LEV)	Yes (80%)
Laboratory activities	PROC 15	No (0 %)	Yes (80%)

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= 8.4 µg/L to 12 000 µg/L, PNECaquatic= 0.56 µg/L to 770 µg/L, PNECsoil= 0.12 mg/kg ww to 29 000 mg/kg ww, PNECsediment= 0.29 mg/kg ww to 73 000 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. Quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation and aspiration toxicity.

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)	5.3E-02	RCR effluent	7.1E-02
PEC freshwater (mg/L)	5.3E-03	RCR freshwater	1.1E-01
PEC marine (mg/L)	5.3E-04	RCR marine	1.1E-02
PEC freshwater sediment (mg/kg ww)	1.9E-01	RCR freshwater sediment	1.2E-01
PEC marine sediment (mg/kg ww)	1.9E-02	RCR marine sediment	1.2E-02
PEC agricultural soil (mg/kg ww)	3.9E-03	RCR agricultural soil	1.2E-02

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 = 0.07).

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. DNEL (inhalation) = 9.4 mg/m³, DNEL (dermal) = 1.3 mg/kg bw/day.

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m ³)	RCR	Estimate (mg/kg bw/day)	RCR	
Transfer from/pouring from containers, manual (and cleaning and maintenance)	1. PROC 8a (duration < 1 h, no LEV)	1.19	0.127	0.685	0.527	0.654
	2. PROC 8a (duration < 8 h, LEV)	0.597	0.063	0.685	0.527	0.590
Bulk transfers, material transfers	PROC 8b	1.79	0.179	0.685	0.527	0.718
Preparation of material for application. Mixing operations (open systems).	PROC 5	29.9	0.58	1.371	0.241	0.821
General process exposures - closed process	PROC 1	0.06	0.001	0.007	0.001	0.01
Film formation - force drying	PROC 2	1.495	0.159	0.274	0.210	0.369
Film formation - air drying	PROC 4	2.99	0.318	0.343	0.263	0.581
Spraying (manual / automatic)	PROC 7	2.99	0.318	0.2143	0.164	0.482
Material transfers. Drum/batch transfers. Transfer from/ pouring from containers.	PROC 9	2.99	0.318	0.342	0.263	0.581
Roller, spreader, flow application	PROC 10	5.973	0.636	0.274	0.211	0.847
Dipping, immersion and pouring	PROC 13	5.979	0.636	0.1371	0.105	0.741

Production of preparations by tableting, compression, extrusion, pelletisation.	PROC 14	2.99	0.318	0.686	0.527	0.845
Laboratory activities	PROC 15	2.99	0.318	0.068	0.052	0.370

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. 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.

This exposure scenario does not address consumers or professional workers.

3: Professional uses of renewable diesel in coatings

1. Title of Exposure scenario	
Free text title: Professional uses of renewable diesel in coatings	CSR-ES 6
Market sector: Coatings (paints, inks, adhesives etc.)	PC: 9a
Description of process(es) covered in the Exposure Scenario:	
Environment: ESVOC SPERC 8.3b.v1 Uses in Coatings (wide dispersive uses): solvent-borne	ESVOC SPERC 8.3b.v1
Worker contributing scenarios	SU 22
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	PROC 8a
Filling / preparation of equipment (from drums or containers)	PROC 8b
Preparation of material for application. Mixing operations (open systems) (indoor / outdoor)	PROC 5
General process exposures - closed process	PROC 1
General process exposures - closed systems (occasional exposure)	PROC 2
Preparation or material for application. Mixing operations (closed systems)	PROC 3
Film formation - air drying (indoor / outdoor)	PROC 4
Roller, spreader, flow application (indoor / outdoor)	PROC 10
Manual spraying (indoor / outdoor)	PROC 11
Dipping, immersion and pouring (indoor / outdoor)	PROC 13
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	PROC 19
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, brush, spreader by hand or similar methods, 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 (diesel 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 modelling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	6.3E-10 - 510 mg/L (experimental test result for the substance: 1 mg/L)
Log Henry's Law Constants	-6.08 – 2.65 (atm·m ³ /mol)
Log Kow	2.55 – 13.23 (experimental test result for the substance: 6)
Log Koc	2.31 – 9.53
Half-life - Air	0.64 – 40 h
Half-life – Water	3.7 – 7300 d
Half-life – Soil	3.7 – 7300 d
Half-life – Sediment	15 – 29000 d
Half-life - Wastewater	0.46 – 2300 h

Amounts used	
Annual use - local:	≤ 5 tonnes/year
Daily use - local:	≤ 0.014 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	
The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.	
Assumes some disposal via wastewater. As a default wastewaters are treated off site (municipal STP) and sludge is applied to agricultural soil. No obligatory RMMs are assumed.	
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. RMM: None assumed.
	Environmental compartment
	water
	air (final)
	soil
Technical measures to reduce releases to air	Assumed air treatment efficiency: 0 %
	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: 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 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				
<u>Assessment approach:</u> 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 and aspiration toxicity.				
Physical form:	liquid			
Molecular weight:	205 g/mol (average molecular weight based on analytical substance identification data)			
Vapour pressure:	100 Pa at 37 °C (test result: Vp < 0.1 kPa) 10 001 Pa at > 40 °C (model default value for elevated temperature)			
Concentration of substance in product:	PROC8a, PROC8b, PROC5: as such (100 %) PROC1, PROC2, PROC3, PROC4, PROC13: > 25 % (up to 100 %) in the mixture PROC10: 5-25 % (<i>concentration limited to demonstrate safe use</i>) PROC11, PROC19: 1-5 % (<i>concentration limited to demonstrate safe use</i>)			
Frequency and duration of use/exposure and other operational conditions affecting workers exposure				
Contributing scenario	PROC	duration	place of use	temperature
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	PROC 8a	< 1 h	1. Indoor 2. Outdoor	≤ 40 °C
Filling / preparation of equipment (from drums or containers)	PROC 8b	< 8 h	Indoor	≤ 40 °C
Preparation of material for application. Mixing operations (open systems) (indoor / outdoor)	PROC 5	< 4 h	1. Indoor 2. Outdoor	≤ 40 °C
General process exposures - closed process	PROC 1	< 8 h	Indoor	≤ 40 °C
General process exposures - closed systems (occasional exposure)	PROC 2	< 8 h	Indoor	≤ 40 °C
Preparation of material for application. Mixing operations (closed systems)	PROC 3	< 8 h	Indoor	≤ 40 °C
Film formation - air drying (indoor / outdoor)	PROC 4	1. < 8 h 2. < 4 h	1. Indoor 2. Outdoor	≤ 40 °C
Roller, spreader, flow application (indoor / outdoor)	PROC 10	1. < 8 h 2. < 8 h 3. < 1 h	1. Indoor 2. Outdoor 3. Outdoor	≤ 40 °C
Manual spraying (indoor / outdoor)	PROC 11	1. < 8 h 2. < 1 h	1. Indoor 2. Outdoor	≤ 40 °C
Dipping, immersion and pouring (indoor / outdoor)	PROC 13	1. < 8 h 2. < 4 h	1. Indoor 2. Outdoor	≤ 40 °C
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	PROC 19	< 4 h	1. 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: Basic				
Contributing scenario	PROC	Level of containment		
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	PROC 8a	No containment		
Filling / preparation of equipment (from drums or containers)	PROC 8b	Semi-closed process with occasional controlled exposure		
Preparation of material for application. Mixing operations (open systems) (indoor / outdoor)	PROC 5	No containment		
General process exposures - closed process	PROC 1	Closed system (minimal contact during routine operations)		

General process exposures - closed systems (occasional exposure)	PROC 2	Closed continuous process with occasional controlled exposure		
Preparation or material for application. Mixing operations (closed systems)	PROC 3	Closed batch process with occasional controlled exposure		
Film formation - air drying (indoor / outdoor)	PROC 4	Semi-closed process with occasional controlled exposure		
Roller, spreader, flow application (indoor / outdoor)	PROC 10	No containment		
Manual spraying (indoor / outdoor)	PROC 11	No containment		
Dipping, immersion and pouring (indoor / outdoor)	PROC 13	No containment		
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	PROC 19	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 (relevant for indoor location only)	
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	PROC 8a	No (0 %)	Good (3-5 air changes per hour)	
Filling / preparation of equipment (from drums or containers)	PROC 8b	Yes (90 %): LEV	Good (3-5 air changes per hour)	
Preparation of material for application. Mixing operations (open systems) (indoor / outdoor)	PROC 5	No (0 %)	Good (3-5 air changes per hour)	
General process exposures - closed process	PROC 1	No (0 %)	Good (3-5 air changes per hour)	
General process exposures - closed systems (occasional exposure)	PROC 2	No (0 %)	Good (3-5 air changes per hour)	
Preparation or material for application. Mixing operations (closed systems)	PROC 3	No (0 %)	Good (3-5 air changes per hour)	
Film formation - air drying (indoor / outdoor)	PROC 4	1. Yes (80 %) indoor: LEV 2. No (0 %) outdoor	Good (3-5 air changes per hour)	
Roller, spreader, flow application (indoor / outdoor)	PROC 10	1. Yes (80 %) indoor: LEV 2. No (0 %) outdoor	Good (3-5 air changes per hour)	
Manual spraying (indoor / outdoor)	PROC 11	1. Yes (80 %) indoor: LEV 2. No (0 %) outdoor	Good (3-5 air changes per hour)	
Dipping, immersion and pouring (indoor / outdoor)	PROC 13	1. Yes (80 %) indoor: LEV 2. No (0 %) outdoor	Good (3-5 air changes per hour)	
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	PROC 19	Yes (80 %)	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 (gloves conforming to EN374) [Eff. Dermal: %]
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	PROC 8a	Yes (90 %)	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 (95%)
Filling / preparation of equipment (from drums or containers)	PROC 8b	Yes (90 %)		Yes (95%)
Preparation of material for application. Mixing operations (open systems) (indoor / outdoor)	PROC 5	Yes (90 %)		Yes (95%)
General process exposures - closed process	PROC 1	No (0 %)		Yes (80%)
General process exposures - closed systems (occasional exposure)	PROC 2	Yes (90 %)		Yes (80%)

Preparation or material for application. Mixing operations (closed systems)	PROC 3	Yes (90 %)		Yes (80%)
Film formation - air drying (indoor / outdoor)	PROC 4	Yes (90 %)		Yes (95%)
Roller, spreader, flow application (indoor / outdoor)	PROC 10	1. Yes (90 %) <i>indoor < 8 h</i> 3. Yes (90 %) <i>outdoor < 1 h</i>		Yes (95%)
Manual spraying (indoor / outdoor)	PROC 11	1. Yes (90 %) <i>indoor < 8 h, LEV</i> 2. Yes (90 %) <i>outdoor < 1 h</i>		Yes (95%)
Dipping, immersion and pouring (indoor / outdoor)	PROC 13	Yes (90 %)		Yes (90%)
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	PROC 19	No (0 %)		Yes (90%)

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: $PNEC_{wastewater} = 8.4 \mu g/L$ to $12\,000 \mu g/L$, $PNEC_{aquatic} = 0.56 \mu g/L$ to $770 \mu g/L$, $PNEC_{soil} = 0.12 mg/kg$ ww to $29\,000 mg/kg$ ww, $PNEC_{sediment} = 0.29 mg/kg$ ww to $73\,000 mg/kg$ 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. Quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation and aspiration toxicity.

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)	3.1E-03	RCR effluent	4.2E-03
PEC freshwater (mg/L)	3.1E-04	RCR freshwater	6.2E-03
PEC marine (mg/L)	3.1E-05	RCR marine	6.2E-04
PEC freshwater sediment (mg/kg ww)	1.1E-02	RCR freshwater sediment	7.0E-03
PEC marine sediment (mg/kg ww)	1.1E-03	RCR marine sediment	7.0E-04
PEC agricultural soil (mg/kg ww)	3.5E-03	RCR agricultural soil	5.6E-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 < 0.0001).

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. DNEL (inhalation) = $9.4 mg/m^3$, DNEL (dermal) = $1.3 mg/kg$ bw/day.

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m^3)	RCR	Estimate (mg/kg bw/day)	RCR	
Material transfers. Pumped drum/batch transfers. Cleaning and maintenance.	1. PROC 8a (indoor)	2.99	0.318	0.685	0.527	0.845
	2. PROC 8a (outdoor)	2.99	0.318	0.685	0.527	0.845

Filling / preparation of equipment (from drums or containers)	PROC 8b	0.597	0.06	0.685	0.527	0.590
Preparation of material for application. Mixing operations (indoor/outdoor)	1. PROC 5 (indoor)	3.587	0.381	0.685	0.527	0.908
	2. PROC 5 (outdoor)	3.587	0.381	0.685	0.527	0.908
General process exposures - closed process	PROC 1	0.06	0.001	0.007	<0.01	0.01
General process exposures - closed systems (occasional exposure)	PROC 2	2.99	0.318	0.274	0.210	0.528
Preparation of material for application. Mixing operations (closed systems)	PROC 3	1.794	0.190	0.138	0.106	0.297
Film formation - air drying (indoor / outdoor)	1. PROC 4 (indoor, LEV)	1.196	0.127	0.343	0.263	0.391
	2. PROC 4 (outdoor, duration < 4 h)	3.587	0.381	0.343	0.263	0.645
Roller, spreader, flow application (indoor / outdoor)	1. PROC 10 (indoor, LEV, RPE)	1.794	0.190	0.823	0.633	0.823
	2. PROC 10 (outdoor, duration < 1 h, RPE)	1.794	0.190	0.823	0.633	0.823
Manual spraying (indoor / outdoor)	1. PROC 11 (indoor, LEV)	3.417	0.363	1.075	0.428	0.792
	2. PROC 11 (outdoor, duration < 4 h)	2.392	0.254	1.075	0.428	0.683
Dipping, immersion and pouring (indoor / outdoor)	1. PROC 13 (indoor, LEV)	1.196	0.127	0.686	0.527	0.654
	2. PROC 13 (outdoor, duration < 4 h)	3.587	0.381	0.686	0.527	0.909
Hand application - fingerpaints, pastels, adhesives (indoor / outdoor)	1. PROC 19 (indoor)	3.588	0.381	0.565	0.435	0.816
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. 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.						
This exposure scenario does not address consumers or industrial workers.						

4: Industrial use of renewable diesel as a fuel

1. Title of Exposure scenario	
Free text title: Industrial use of renewable diesel as a fuel	CSR-ES 7
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. Refuelling vehicles.	PROC 8b
General use exposures as a fuel (closed equipment)	PROC 1
General use exposures as a fuel (closed, occasional exposure)	PROC 2
Use as a fuel additive diluent	PROC 3
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 (diesel 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 modelling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	6.3E-10 - 510 mg/L (experimental test result for the substance: 1 mg/L)
Log Henry's Law Constants	-6.08 – 2.65 (atm·m ³ /mol)
Log Kow	2.55 – 13.23 (experimental test result for the substance: 6)
Log Koc	2.31 – 9.53
Half-life - Air	0.64 – 40 h
Half-life – Water	3.7 – 7300 d
Half-life – Soil	3.7 – 7300 d
Half-life – Sediment	15 – 29000 d
Half-life - Wastewater	0.46 – 2300 h
Amounts used	
Annual use at a site:	≤ 10 000 tonnes/year
Daily use at a site:	≤ 33 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 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
	water
	air (final)
	soil
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 %)
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 m³/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 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:

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 and aspiration toxicity.

Physical form:	liquid
Molecular weight:	205 g/mol (average molecular weight based on analytical substance identification data)
Vapour pressure:	100 Pa at 37 °C (test result: Vp < 0.1 kPa) 10 001 Pa at > 40 °C (model default value for elevated temperature)
Concentration of substance in product:	As such (100 %)

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. Refuelling vehicles.	PROC 8b	< 4 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (closed equipment)	PROC 1	< 8 h	Indoor	≤ 40 °C
General use exposures as a fuel (closed, occasional exposure)	PROC 2	< 8 h	Indoor	≤ 40 °C
Use as a fuel additive diluent	PROC 3	< 8 h	Indoor	≤ 40 °C
Use as a fuel	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. Refuelling vehicles.	PROC 8b	Semi-closed process with occasional controlled exposure
General use exposures as a fuel (closed equipment)	PROC 1	Closed system (minimal contact during routine operations)
General use exposures as a fuel (closed, occasional exposure)	PROC 2	Closed continuous process with occasional controlled exposure
Use as a fuel additive diluent	PROC 3	Closed batch 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 *or operation undertaken outdoors
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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: 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	1. No (0 %) 2. 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. Refuelling vehicles.	PROC 8b	No (0 %)	1. Good (3-5 air changes per hour) <i>indoor</i> 2. not applicable <i>outdoor</i>
General use exposures as a fuel (closed equipment)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*
General use exposures as a fuel (closed, occasional exposure)	PROC 2	No (0 %)	Good (3-5 air changes per hour)*
Use as a fuel additive diluent	PROC 3	No (0 %)	Good (3-5 air changes per hour)*
Use as a fuel	PROC 16	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: %)	Dermal protection (Effectiveness %)	Eye/face protection:
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (90 %)	Yes (95 %)	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)
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (90 %)	Yes (95 %)	
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refuelling vehicles.	PROC 8b	Yes (90 %) (or LEV)	Yes (95 %)	
General use exposures as a fuel (closed equipment)	PROC 1	no	Yes (80 %)	
General use exposures as a fuel (closed, occasional exposure)	PROC 2	no	Yes (80 %)	
Use as a fuel additive diluent	PROC 3	Yes (90 %) (or LEV)	Yes (80 %)	
Use as a fuel	PROC 16	no	Yes (80 %)	

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: $PNEC_{wastewater} = 8.4 \mu\text{g/L}$ to $12\,000 \mu\text{g/L}$, $PNEC_{aquatic} = 0.56 \mu\text{g/L}$ to $770 \mu\text{g/L}$, $PNEC_{soil} = 0.12 \text{ mg/kg ww}$ to $29\,000 \text{ mg/kg ww}$, $PNEC_{sediment} = 0.29 \text{ mg/kg ww}$ to $73\,000 \text{ mg/kg ww}$. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

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

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)	7.6E-03	RCR effluent	1.0E-02
PEC freshwater (mg/L)	7.5E-04	RCR freshwater	1.5E-02

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830



PEC marine (mg/L)	7.5E-05	RCR marine	1.5E-03
PEC freshwater sediment (mg/kg ww)	2.8E-02	RCR freshwater sediment	1.7E-02
PEC marine sediment (mg/kg ww)	2.8E-03	RCR marine sediment	1.7E-03
PEC agricultural soil (mg/kg ww)	1.0E-05	RCR agricultural soil	3.2E-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 < 0.001).

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. DNEL (inhalation) = 9.4 mg/m³, DNEL (dermal) = 1.3 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 < 1 h, no LEV)	1.196	0.127	0.685	0.527	0.654
	2. PROC 8a (duration < 8 h, LEV)	0.597	0.063	0.685	0.527	0.590
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	1. PROC 8a (duration < 1 h, no LEV)	1.196	0.127	0.685	0.527	0.654
	2. PROC 8a (duration < 8 h, LEV)	0.597	0.063	0.685	0.527	0.590
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	1. PROC 8b (indoor)	1.794	0.190	0.685	0.527	0.718
	2. PROC 8b (outdoor)	1.794	0.190	0.685	0.527	0.718
General use exposures as a fuel (closed equipment)	PROC 1	0.06	0.001	0.007	0.001	0.01
General use exposures as a fuel (closed, occasional exposure)	PROC 2	5.979	0.636	0.274	0.210	0.846
Use as a fuel additive diluent	PROC 3	1.794	0.190	0.138	0.106	0.297
Use as a fuel	PROC 16	5.979	0.636	0.068	0.052	0.688

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. 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.

This exposure scenario does not address consumers or professional workers.

5: Professional use of renewable diesel as a fuel

1. Title of Exposure scenario	
Free text title: Professional use of renewable diesel as a fuel	CSR-ES 8
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
Transfers from drums and containers - indoor	PROC 8b
Bulk transfers. Transfers from drums and containers. Refuelling vehicles. - outdoor	PROC 8b
General use exposures as a fuel (closed equipment)	PROC 1
General use exposures as a fuel (closed, occasional exposure)	PROC 2
Use as a fuel additive diluent	PROC 3
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	
<u>Properties of Renewable hydrocarbons (diesel type fraction):</u> 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 modelling tool (PETRORISK v6.02). Ranges for the representative structures are reported below.	
Water solubility	6.3E-10 - 510 mg/L (experimental test result for the substance: 1 mg/L)
Log Henry's Law Constants	-6.08 – 2.65 (atm·m ³ /mol)
Log Kow	2.55 – 13.23 (experimental test result for the substance: 6)
Log Koc	2.31 – 9.53
Half-life - Air	0.64 – 40 h
Half-life – Water	3.7 – 7300 d
Half-life – Soil	3.7 – 7300 d
Half-life – Sediment	15 – 29000 d
Half-life - Wastewater	0.46 – 2300 h
Amounts used	
Annual use - local:	≤ 5 tonnes/year
Daily use - local:	≤ 0.014 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	
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)	0.01 %
	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 m³/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.

2.2 Control of workers exposure

Product characteristic

Assessment approach:

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 and aspiration toxicity.

Physical form:	liquid
Molecular weight:	205 g/mol (average molecular weight based on analytical substance identification data)
Vapour pressure:	100 Pa at 37 °C (test result: Vp < 0.1 kPa)

	10 001 Pa at > 40 °C (model default value for elevated temperature)			
Concentration of substance in product:	As such (100 %)			
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
Transfers from drums and containers - indoor	PROC 8b	< 8 h	Indoor	≤ 40 °C
Bulk transfers. Transfers from drums and containers. Refuelling vehicles. - outdoor	PROC 8b	1. < 8 h 2. < 1 h	Outdoor	≤ 40 °C
General use exposures as a fuel (closed equipment)	PROC 1	< 8 h	Indoor	≤ 40 °C
General use exposures as a fuel (closed, occasional exposure)	PROC 2	< 8 h	Indoor	≤ 40 °C
Use as a fuel additive diluent	PROC 3	< 8 h	Indoor	≤ 40 °C
Use as a fuel	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: 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.-indoor/outdoor	PROC 8b	Semi-closed process with occasional controlled exposure		
General use exposures as a fuel (closed equipment)	PROC 1	Closed system (minimal contact during routine operations)		
General use exposures as a fuel (closed, occasional exposure)	PROC 2	Closed continuous process with occasional controlled exposure		
Use as a fuel additive diluent	PROC 3	Closed batch 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 (LEV) / other RMM (Eff. Inhal: %)	General ventilation *or operation outdoors	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. No (0 %) duration < 1 h 2. Yes (80 %) duration < 8 h: 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	1. No (0 %) duration < 1 h 2. Yes (80 %) duration < 8 h: LEV or SOP (eg. drain down prior to maintenance)	not applicable	
Transfers from drums and containers - indoor	PROC 8b	Yes (90 %): Material transfers under containment or extract ventilation	Good (3-5 air changes per hour)	
Bulk transfers. Transfers from drums and containers. Refuelling vehicles. - outdoor	PROC 8b	1. Yes (90 %) duration < 8 h: Material transfers under containment or extract ventilation 2. No (0 %) duration < 1 h	not applicable	
General use exposures as a fuel (closed equipment)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*	
General use exposures as a fuel (closed, occasional exposure)	PROC 2	No (0 %)	Good (3-5 air changes per hour)*	
Use as a fuel additive diluent	PROC 3	No (0 %)	Good (3-5 air changes per hour)*	

Use as a fuel	PROC 16	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 (gloves conforming to EN374) [Eff. Dermal %]
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (90 %)	Eye protection: Goggles or safety glasses with side shields (EN166)
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (90 %)	Yes (95 %)
Transfers from drums and containers - indoor	PROC 8b	No (0 %)	Eye protection where there is potential for exposure.
Bulk transfers. Transfers from drums and containers. Refuelling vehicles. - outdoor	PROC 8b	Yes (90 %)	(PROC1, PROC16: good practice advice, see below)
General use exposures as a fuel (closed equipment)	PROC 1	No (0 %)	Yes (80 %)
General use exposures as a fuel (closed, occasional exposure)	PROC 2	Yes (90 %) (Or LEV)	Yes (80 %)
Use as a fuel additive diluent	PROC 3	Yes (90 %) (Or LEV)	Yes (80 %)
Use as a fuel	PROC 16	No (0 %)	Yes (-) (good practice advice, see below)

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: $PNEC_{wastewater} = 8.4 \mu\text{g/L}$ to $12\,000 \mu\text{g/L}$, $PNEC_{aquatic} = 0.56 \mu\text{g/L}$ to $770 \mu\text{g/L}$, $PNEC_{soil} = 0.12 \text{ mg/kg ww}$ to $29\,000 \text{ mg/kg ww}$, $PNEC_{sediment} = 0.29 \text{ mg/kg ww}$ to $73\,000 \text{ mg/kg ww}$. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.

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

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)	3.1E-06	RCR effluent	4.2E-06
PEC freshwater (mg/L)	6.6E-07	RCR freshwater	1.5E-05
PEC marine (mg/L)	3.1E-08	RCR marine	6.2E-07
PEC freshwater sediment (mg/kg ww)	1.1E-05	RCR freshwater sediment	7.0E-06
PEC marine sediment (mg/kg ww)	1.1E-06	RCR marine sediment	7.0E-07
PEC agricultural soil (mg/kg ww)	3.5E-06	RCR agricultural soil	5.6E-06

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 $RCR < 0.000001$).

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. DNEL (inhalation) = 9.4 mg/m³, DNEL (dermal) = 1.3 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 < 1 h, no LEV)	2.99	0.318	0.685	0.527	0.845
	2. PROC 8a (duration < 8 h, LEV/SOP)	1.49	0.318	0.685	0.527	0.686
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	1. PROC 8a (duration < 1 h, no LEV)	2.99	0.318	0.685	0.527	0.845
	2. PROC 8a (duration < 8 h, LEV/SOP)	1.495	0.159	0.685	0.527	0.686
Transfers from drums and containers - indoor	PROC 8b	0.597	0.063	0.685	0.527	0.590
Bulk transfers. Transfers from drums and containers. Refuelling vehicles. - outdoor	1. PROC 8b (duration < 8 h, LEV)	0.597	0.063	0.685	0.527	0.590
	2. PROC 8b (duration < 1 h, no LEV)	1.196	0.127	0.685	0.527	0.654
General use exposures as a fuel (closed equipment)	PROC 1	0.06	0.001	0.007	0.001	0.01
General use exposures as a fuel (closed, occasional exposure)	PROC 2	2.99	2.99	0.274	0.210	0.528
Use as a fuel additive diluent	PROC 3	1.794	0.190	0.138	0.106	0.297
Use as a fuel	PROC 16	5.979	0.636	0.068	0.052	0.688

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. 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.

This exposure scenario does not address consumers or industrial workers.

UPM BIOVERNO DIESEL

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2015/830
