UPM BIOVERNO NAPHTHA

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Issue date: 6/6/2017 Revision date: 12/14/2022 Version: 8.0

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

1.1. Product identifier

Product form	:	Substance
Trade name	:	UPM BIOVERNO NAPHTHA
Chemical name	:	Renewable hydrocarbons of wood origin (gasoline type fraction)
EC-No.	:	700-918-8
CAS-No.	:	Not available
REACH registration No	:	01-2120052681-60-0000

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, formulation and use as intermediate. Use as a fuel and in coatings.

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	Giftlinjen 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 (Wirtschaftgebäude), 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"	Boulevardul 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]

Flammable liquids, Category 2	H225
Skin corrosion/irritation, Category 2	H315
Germ cell mutagenicity, Category 1B	H340
Carcinogenicity, Category 1B	H350
Reproductive toxicity, Category 2	H361
Specific target organ toxicity – Single exposure, Category 3, Narcosis	H336
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment – Chronic Hazard, Category 2	H411

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

Adverse physicochemical, human health and environmental effects

Highly flammable liquid and vapour. May cause cancer. May cause genetic defects. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. Causes skin irritation. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08 GHS09

Signal word (CLP)	:	Danger
Hazard statements (CLP)	:	H225 - Highly flammable liquid and vapour. H304 - May be fatal if swallowed and enters airways. H315 - Causes skin irritation. H336 - May cause drowsiness or dizziness. H340 - May cause genetic defects. H350 - May cause cancer. H361 - Suspected of damaging fertility or the unborn child. H411 - Toxic to aquatic life with long lasting effects.
Precautionary statements (CLP)	:	P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P273 - Avoid release to the environment. P280 - Wear protective gloves/protective clothing/eye protection/face protection. P302+P352 - IF ON SKIN: Wash with plenty of water. P308+P313 - IF exposed or concerned: Get medical advice/attention. P331 - Do NOT induce vomiting. P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.
Extra phrases	:	For professional users only.

2.3. Other hazards

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

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 C6 to C10.

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Renewable hydrocarbons of wood origin (gasoline type fraction)	EC-No.: 700-918-8 REACH-no: 01-2120052681-60-0000	100	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1B, H350 Repr. 2, H361 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411

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

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

First-aid measures after inhalation : If exposure to vapour, mists or fumes causes drowsiness, headache, blurred vision or irritation of the eyes, nose or throat, remove immediately to fresh air. Keep patient warm and at rest. If any symptoms persist obtain medical advice. Unconscious casualties must be placed in the recovery position. Monitor breathing and pulse rate and if breathing has failed, or is deemed inadequate, respiration must be assisted, preferably by the mouth to mouth method. Administer external cardiac massage if necessary. Seek medical attention immediately.

First-aid measures after skin contact : Rinse skin with water/shower. Take off immediately all 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, consult a doctor.

First-aid measures after ingestion : Do not induce vomiting. Call a physician immediately. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs.

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

Symptoms/effects : May cause drowsiness or dizziness.

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.Sand.

Unsuitable extinguishing media : Water.

5.2. Special hazards arising from the substance or mixture

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

Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Hazardous decomposition products in case of fire : Toxic fumes may be released. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, sulphur oxides and other organic and inorganic compounds will be evolved when this material undergoes combustion.

5.3. Advice for firefighters

Precautionary measures fire : Cool containers / tanks with spray water if possible. Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE).

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : No open flames, no sparks, and no smoking. Only qualified personnel equipped with suitable protective equipment may intervene. Avoid breathing dust/fume/gas/mist/vapours/spray.

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. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Collect spillage.
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

Precautions for safe handling	:	Ensure good ventilation of the work station. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Floors, walls and other surfaces in the hazard area must be cleaned regularly. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes.
Hygiene measures	:	Separate working clothes from town clothes. Launder separately. 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

Technical measures	:	Ground/bond container and receiving equipment.
Storage conditions	:	Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.

7.3. Specific end use(s)

The exposure scenarios for identified industrial and professional uses are presented in the Annexes of this SDS.
List of Exposure Scenarios:
ES 1 Distribution,use as an intermediate and formulation & (re)packing of renewable naphtha and mixtures (containing 0% to 1% benzene)
ES 2 Industrial uses of renewable naphtha in coatings (containing 0% to 1% benzene)
ES 3 Industrial use of renewable naphtha as a fuel (containing 0% to 1% benzene)
ES 4 Professional use of renewable naphtha as a fuel (containing 0% to 1% benzene).

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

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

UPM BIOVERNO NAPHTHA	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	n-Hexane
IOEL TWA	72 mg/m³
IOEL TWA [ppm]	20 ppm
IOEL STEL	384 mg/m³
IOEL STEL [ppm]	100 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Benzene
BOEL TWA	3.25 mg/m³ (Limit value until 5 April 2024) 1.65 mg/m³ (Limit value from 5 April 2024 until 5 April 2026) 0.66 mg/m³ (Limit value from 5 April 2026)
BOEL TWA [ppm]	1 ppm (Limit value until 5 April 2024) 0.5 ppm (Limit value from 5 April 2024 until 5 April 2026) 0.2 ppm (Limit value from 5 April 2026)
Notes	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
EU - Biological Limit Value (BLV)	
Local name	Benzene
BLV	28 µg/l Parameter: benzene - Medium: blood - Sampling time: immediately end of shift 46 µg/g creatinine Parameter: phenylmercapturic - Medium: urine - Sampling time: end of exposure/shift
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Albania - Occupational Exposure Limits	
Local name	n-Hekzan
OEL TWA	72 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	Lëkurë (tregon mundësinë e një marrjeje të rëndësishme nëpërmjet lëkurës)
Regulatory reference	VENDIM Nr. 522, datë 6.8.2014 PËR MIRATIMIN E RREGULLORES “PËR MBROJTJEN E SIGURISË DHE SHËNDETIT TË PUNËMARRËSVE NGA RISQET E LIDHURA ME AGJENTËT KIMIKË NË PUNË”
Austria - Occupational Exposure Limits	
Local name	n-Hexan
MAK (OEL TWA)	72 mg/m³
MAK (OEL TWA) [ppm]	20 ppm
MAK (OEL STEL)	288 mg/m³ (4x 15(Miw) min)
MAK (OEL STEL) [ppm]	80 ppm (4x 15(Miw) min)
TRK (OEL TWA)	3.2 mg/m³
TRK (OEL TWA) [ppm]	1 ppm

UPM BIOVERNO NAPHTHA	
TRK (OEL STEL)	12.8 mg/m³ (4x 15(Miw) min)
TRK (OEL STEL) [ppm]	4 ppm (4x 15(Miw) min)
Remark	Fortpflanzungsgefährdend: f
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Toluol
BLV	10 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Frauen 12 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Männer 250 µg/l Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Probenahmezeitpunkt: Bei wiederholt erhöhten o-Cresolwerten ist zusätzlich Toluol im Blut am Ende eines Arbeitstages zu bestimmen (der Zeitpunkt der Untersuchung ist anzugeben) 0.8 mg/l Parameter: o-Cresol - Untersuchungsmaterial: Harn
Remark	Eignung: Blut: Erythrozyten: 3,2 Millionen/µl für Frauen, 3,8 Millionen/µl für Männer; Leukozyten: unterer Grenzwert: 4.000/µl (davon 2.000 Granulozyten) bzw. 3.700/µl bei nicht pathologischem Differentialblutbild, oberer Grenzwert: 13.000/µl; Thrombozyten: 150.000 bzw. 130.000/µl bei nicht pathologischem Differentialblutbild Eignung mit vorzeitiger Folgeuntersuchung: Bei Unterschreiten bzw. Überschreiten der Grenzwerte im Blut (ausgenommen Differentialblutbild) oder im Harn sowie bei atypischen Morphologien im Blut. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Eignung mit vorzeitiger Folgeuntersuchung: drei Monate.
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	n-Hexane # n-Hexaan
OEL TWA	72 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
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.)

UPM BIOVERNO NAPHTHA	
Bulgaria - Biological limit values	
Local name	Толуен
BLV	1.6 mmol/mmol Creatinine Биомаркер за експозиция/биомаркер за ефект: хипурова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Няма
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/m³
GVI (OEL TWA) [2]	20 ppm
KGVI (OEL STEL)	384 mg/m³
KGVI (OEL STEL) [ppm]	100 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, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Croatia - Biological limit values	
Local name	n-Heksan
BLV	1.74 µmol/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krv - Vrijeme uzorkovanja: za vrijeme izloženosti 150 µg/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krv - Vrijeme uzorkovanja: za vrijeme izloženosti 1.66 µmol/l Karakteristični pokazatelj: n-heksan - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti 40 ppm Karakteristični pokazatelj: n-heksan - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti 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 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 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 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
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	δέρμα

UPM BIOVERNO NAPHTHA	
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	n-Hexan
PEL (OEL TWA)	70 mg/m³
PEL (OEL TWA) [ppm]	19.5 ppm
NPK-P (OEL C)	200 mg/m³
NPK-P (OEL C) [ppm]	56 ppm
Remark	I - dráždí sliznice (oči, dýchací cesty), respektive kůži, D - při expozici se významně uplatňuje pronikání faktoru kůží.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Czech Republic - Biological limit values	
Local name	Toluen (Methylbenzen)
BLV	1.5 mg/g creatinine Ukazatel: o-Kresol (po hydrolýze) - Biologicky vzorek: moči - Doba odběru: konec směny 1.6 µmol/mmol Creatinine Ukazatel: o-Kresol (po hydrolýze) - Biologicky vzorek: moči - Doba odběru: konec směny 1600 mg/g creatinine Ukazatel: Hippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1000 µmol/mmol Creatinine Ukazatel: Hippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Remark	Je-li hodnota při nálezu kyseliny hippurové vyšší než 1600 mg/g, av šak nepřesahuje 2500 mg/g kreatininu, použije se ke zpřesnění expozice toluenu biologický expoziční test podle ukazatele o-Kresol. Je-li hodnota při nálezu kyseliny hippurové vyšší než 2500 mg/g, považuje se za hodnotu prokazující, že jde o pracovní expozici toluenu, jehož hodnota PEL je překračována a biologický expoziční test podle ukazatele o-Kresol se již neprovádí.
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA [1]	72 mg/m³
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
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/m³

UPM BIOVERNO NAPHTHA	
HTP (OEL TWA) [2]	20 ppm
HTP (OEL STEL)	380 mg/m³
HTP (OEL STEL) [ppm]	100 ppm
Remark	Iho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Tolueeni
BLV	500 nmol/l Parametri: Veren tolueeni - Näytteenottoajankohta: Työpäivän jälkeinen aamu
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	n-Hexane
VME (OEL TWA)	72 mg/m³
VME (OEL TWA) [ppm]	20 ppm
VLE (OEL C/STEL)	384 mg/m³
VLE (OEL C/STEL) [ppm]	100 ppm
Remark	Valeurs règlementaires 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/m³
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 - Occupational Exposure Limits (TRGS 910)	
Local name	Benzol
Acceptable concentration (Volume conc.)	0.06 ppm
Acceptable concentration (Weight conc.)	0.2 mg/m³
Notes	b) Akzeptanzkonzentration assoziiert mit Risiko 4:10000
Tolerance concentration (Volume conc.)	0.6 ppm
Tolerance concentration (Weight conc.)	1.9 mg/m³
Tolerance concentration excess factor	8
Remark	H - Hautresorptiv
Equivalence value for acceptable concentration	0.8 µg/l (3) 3 µg/g creatinine (3)

UPM BIOVERNO NAPHTHA	
Equivalence value for tolerance concentration	5 µg/l 25 µg/g creatinine 500 µg/g creatinine
Parameter	Benzol S-Phenylmerkaptursäure Trans, trans-Muconsäure
This battery has passed the UN Manual of Tests and Criteria part III subsection 38.3 requirements.	U - Urin
Testing time	b - Expositionsende bzw. Schichtende
Regulatory reference	TRGS 910
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	Skin
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
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/m³
CK (OEL STEL)	380 mg/m³
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 expozíciót követően jelentkezik)

UPM BIOVERNO NAPHTHA	
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	2 mg/l Biológiai expozíciós (hatás) mutató: 2,5-hexán-dion (hidrolízis után) - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 18 µmol/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/m³
OEL TWA [2]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 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/m³
OEL TWA [ppm]	20 ppm
Remark	Cute
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	150 mg/m³
OEL STEL [ppm]	40 ppm
Remark	Ietekme uz dzirdi
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2015. gada 7. aprīlī noteikumiem Nr. 163)
Latvia - Biological Exposure Indices	
Local name	Toluolam

UPM BIOVERNO NAPHTHA	
BEI	1.6 g/g creatinine Urīnā maiņas beigās nosaka hipurskābi 0.05 mg/l Toluolu asinīs
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2021. gada 18. februārī noteikumiem Nr. 110)
Lithuania - Occupational Exposure Limits	
Local name	n-heksanas
IPRV (OEL TWA)	72 mg/m³
IPRV (OEL TWA) [ppm]	20 ppm
TPRV (OEL STEL)	384 mg/m³
TPRV (OEL STEL) [ppm]	100 ppm
Remark	R (reprodukcijai toksiškas 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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	Peau
Regulatory reference	Mémorial A Nº 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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	Skin # Ġilda
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/m³
TGG-15min (OEL STEL)	144 mg/m³
Remark	Kankerverwekkende stof. H (Huidopname) Stoffen die relatief gemakkelijk door de huid kunnen worden opgenomen, hetgeen een substantiële bijdrage kan betekenen aan de totale inwendige blootstelling, hebben in de lijst een H-aanduiding. Bij deze stoffen moeten naast maatregelen tegen inademing ook adequate maatregelen ter voorkoming van huidcontact worden genomen.
Regulatory reference	Arbeidsomstandighedenregeling 2022
Poland - Occupational Exposure Limits	
Local name	Heksan (n-heksan)

UPM BIOVERNO NAPHTHA	
NDS (OEL TWA)	72 mg/m³
NDSCh (OEL STEL)	200 mg/m³
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
OEL STEL [ppm]	2.5 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 - Notaçao: Sem hidrólise
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA	72 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 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 Indicador biologic: 2,5 hexandionă - Material biologic: urină - Momentul recoltarii: sfârşit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 584/2018)
Serbia - Occupational Exposure Limits	
Local name	н-хексан
OEL TWA	72 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	384 mg/m³
OEL STEL [ppm]	100 ppm
Remark	ЕУ** – напомена да се ради о хемијским материјама за које су утврђене индикативне граничне вредности изложености према Директиви 2006/15/ЕЗ (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

UPM BIOVERNO NAPHTHA	
NPHV (OEL TWA) [1]	72 mg/m³
NPHV (OEL TWA) [2]	20 ppm
NPHV (OEL STEL)	140 mg/m³
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/m³
OEL TWA [ppm]	20 ppm
OEL STEL	576 mg/m³
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
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
Remark	BAT vrednosti za rakotvorne ali mutagene snovi
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/m³
VLA-ED (OEL TWA) [2]	20 ppm
VLA-EC (OEL STEL)	384 mg/m³
VLA-EC (OEL STEL) [ppm]	100 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

UPM BIOVERNO NAPHTHA	
Sweden - Occupational Exposure Limits	
Local name	n-Hexan
NGV (OEL TWA)	72 mg/m³
NGV (OEL TWA) [ppm]	20 ppm
KTV (OEL STEL)	180 mg/m³
KTV (OEL STEL) [ppm]	50 ppm
Remark	B (Ämnet kan orsaka hörselskada. Exponering för ämnet nära det befintliga yrkeshygieniska gränsvärdet och vid samtidig exponering för buller nära insatsvärdet 80 dB kan orsaka hörselskada); H (Ämnet kan lätt upptas genom huden. Det föreskrivna gränsvärdet bedöms ge tillräckligt skydd endast under förutsättning att huden är skyddad mot exponering för ämnet ifråga)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	n-Hexane
WEL TWA (OEL TWA) [1]	72 mg/m³
WEL TWA (OEL TWA) [2]	20 ppm
WEL STEL (OEL STEL)	384 mg/m³
WEL STEL (OEL STEL) [ppm]	100 ppm
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	n-Hexan
OEL TWA	72 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	188 mg/m³
OEL STEL [ppm]	50 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	n-heksan
Grenseverdi (OEL TWA) [1]	72 mg/m³
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/m³
OEL TWA [ppm]	20 ppm

UPM BIOVERNO NAPHTHA	
KTV	2
Short time value [mg/m³]	144 mg/m³
Short time value [ppm]	40 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 супстанци („Службен весник на Република Македонија” бр.46/10)
Switzerland - Occupational Exposure Limits	
Local name	n-Hexane / n-Hexan
MAK (OEL TWA) [1]	180 mg/m³
MAK (OEL TWA) [2]	50 ppm
KZGW (OEL STEL)	1440 mg/m³
KZGW (OEL STEL) [ppm]	400 ppm
Critical toxicity	Yeux, SN / Auge, NS
Notation	R, $R2_F$, SS_C, B / H, $R2_F$, 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 NAPHTHA	
DNEL/DMEL (Workers)	
Long-term - systemic effects, dermal	234 mg/kg bw/day The dermal DMEL is extrapolated from the BOELV for benzene.

UPM BIOVERNO NAPHTHA	
Long-term - local effects, dermal	Low hazard is assigned as the substance is classified for as skin irritant. The appropriate RMMs are in use to avoid skin contact (See section 8.2 and Annex).
Long-term - systemic effects, inhalation	3.25 mg/m³ DMEL value is based on the Binding Occupational Exposure Limit value (BOELV) for benzene, the most hazardous constituent in the substance. BOELV can be used in place of a formal DN(M)EL provided no new scientific information exists which challenges the validity of the BOELV.
DNEL/DMEL (General population)	
Long-term - systemic effects,oral	0.234 µg/kg bodyweight/day The oral DMEL is extrapolated from the inhalation DMEL for benzene .
Long-term - systemic effects, inhalation	3.25 µg/m³ Based on the carcinogenicity risk caused by the most hazardous component i.e. benzene.
Long-term - local effects, dermal	0.234 mg/kg bw/day The dermal DMEL is extrapolated from the inhalation DMEL for benzene.
PNEC (Water)	
PNEC aqua (freshwater)	0.88 – 2100 µg/L The overall range (all representative components of the substance) for the PNEC(aqueous) values estimated with the PETRORISK tool.
PNEC aqua (marine water)	0.88 – 2100 µg/L The overall range (all representative components of the substance) for the PNEC(aqueous) values estimated with the PETRORISK tool.
PNEC (Sediment)	
PNEC sediment (freshwater)	0.33 – 6.7 µg/kg wet weight The overall range (all representative components of the substance) for the PNEC(sediment) values estimated with the PETRORISK tool
PNEC sediment (marine water)	0.33 – 6.7 mg/kg wet weight The overall range (all representative components of the substance) for the PNEC(sediment) values estimated with the PETRORISK tool
PNEC (STP)	
PNEC sewage treatment plant	13 – 34000 µg/l. The overall range (all representative components of the substance) for the PNEC(soil) values estimated with the PETRORISK tool.
PNEC (Soil)	
PNEC soil	0.13 – 2.7 mg/kg wet weight The overall range (all representative components of the substance) for the PNEC(soil) values 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:
Ensure good ventilation of the work station.

8.2.2. Personal protection equipment

Personal protective equipment symbol(s):

8.2.2.1. Eye and face protection

Eye protection:
Safety glasses

Eye protection			
Type	**Field of application**	**Characteristics**	**Standard**
Face shield, Use eye protection according to EN 166, Safety goggles			EN 166

8.2.2.2. Skin protection

Skin and body protection:
Wear suitable protective clothing

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 inadequate ventilation] wear respiratory protection.

Respiratory protection			
Device	**Filter type**	**Condition**	**Standard**
Air-Purifying Respirator (APR), reusable	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
Colour	:	Colourless.
Appearance	:	Clear, colorless liquid.
Odour	:	Unique hydrocarbon odor.
Odour threshold	:	Not available
Melting point/ Freezing point	:	< -50 °C at 101.3 kPa (pour point, DIN ISO 3016)
Boiling point	:	40 – 190 °C (typical at 101.3 kPa (EN ISO 3405)
Flammability	:	Highly flammable liquid and vapour.
Explosive properties	:	Not explosive.
Oxidising properties	:	Not oxidising.
Explosive limits	:	Not available
Lower explosion limit	:	No information available
Upper explosion limit	:	No information available
Flash point	:	10 °C (ASTM D93 closed cup)
Auto-ignition temperature	:	> 240 °C (EU A.15)
Decomposition temperature	:	Not available
pH	:	Not available
Viscosity, kinematic	:	< 1 mm²/s at 38 °C (DIN EN ISO 3104)
Solubility	:	Water: 18 mg/l at 25 °C(partly soluble)
Partition coefficient n-octanol/water (Log Kow)	:	4.7 at 22 °C (EU A.8)

Vapour pressure	:	35 kPa at 38 °C (DIN EN 13016-1)
Vapour pressure at 50 °C	:	Not available
Density	:	720 – 775 kg/m³ at 15°C (EN ISO12185)
Relative density	:	Not available
Relative vapour density at 20 °C	:	Not available
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

Relative evaporation rate (butylacetate=1)	:	Not known
Adsorption coefficient (log Koc)	:	The overall range (all components) for the estimated log Koc values are from 1.83 to 5.20 (PETRORISK modelling)

SECTION 10: Stability and reactivity

10.1. Reactivity

Highly flammable liquid and vapour.

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

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

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. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:

SECTION 11: Toxicological information

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

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

UPM BIOVERNO NAPHTHA	
LD50 oral rat	> 2000 mg/kg bw/day (OECD 420)
LD50 dermal rabbit	2920 mg/kg bw/day (rabbits were exposed to similar UVCB substance)
LC50 Inhalation - Rat	23400 mg/m³ (8-hour exposure; volatile constituent in the substance; nonane)

Skin corrosion/irritation	:	Causes skin irritation.
Serious eye damage/irritation	:	Not classified (Based on available data, the classification criteria are not met)
Respiratory or skin sensitisation	:	Guinea pig, guinea pig maximisation test: not sensitising (Equivalent or similar to OECD Guideline 406). No classification regarding sensitisation is required. (Based on available data, the classification criteria are not met)

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. The substance was non-mutagenic in bacterial reverse mutagenicity test (OECD 471). Although this single study does not support the classification for mutagenicity, this substance is regarded as germ cell mutagen based on the benzene content in the substance.
Carcinogenicity	:	The substance is considered carcinogenic based on the benzene content.
Reproductive toxicity	:	This substance is suspected of damaging fertility and the unborn child based on the n-hexane and toluene content.
STOT-single exposure	:	May cause drowsiness or dizziness.
STOT-repeated exposure	:	Not classified (The substance has not been classified for STOT-RE. This substance contains n-hexane, toluene and benzene which have harmonised classification for STOT-RE. However, based on the CLP mixtures rules no classification of this substance is warranted.)
Aspiration hazard	:	May be fatal if swallowed and enters airways. (Based on the kinematic viscosity the substance is classified for aspiration hazard.)

UPM BIOVERNO NAPHTHA	
Viscosity, kinematic	< 1 mm²/s at 38 °C (DIN EN ISO 3104)

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	:	Toxic to aquatic life. Toxic to aquatic life with long lasting effects.
Ecology - water	:	This substance is classified as hazardous to the aquatic environment (Aquatic chronic 2 H411)
Hazardous to the aquatic environment, short–term (acute)	:	Not classified
Hazardous to the aquatic environment, long–term (chronic)	:	Toxic to aquatic life with long lasting effects.

UPM BIOVERNO NAPHTHA	
LC50 - Fish [1]	10 mg/l 96-h LL50(mortality, Oncorhynchus mykiss): 10 mg/l (OECD 203); analogue
EC50 - Crustacea [1]	7.6 mg/l 48-h EL50(immobilisation; Daphnia magna) 7.6 mg/l (OECD 202) analogue
EC50 72h - Algae [1]	> 100 mg/l 72-h EL50 (growth rate; Desmodesmus subspicatus) > 100 mg/l (OECD 201)
Toxicity to activated sludge respiration	EL10 (3h): 34.78 mg/l (OECD 209)

12.2. Persistence and degradability

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

12.3. Bioaccumulative potential

UPM BIOVERNO NAPHTHA	
Partition coefficient n-octanol/water (Log Kow)	4.7 at 22 °C (EU A.8)

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

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

UPM BIOVERNO NAPHTHA	
Not classified as PBT or vPvB.	
Results of PBT assessment	Persistent: This substance is persistent since it contains both biodegradable and nonbiodegradable constituents. It is however considered as readily biodegradable in water. Bioaccumulation: Based on test results from the octanol-water partitioning coefficient study (log Kow of 4.7) the substance might contain substances having potential for bioaccumulation. Bioconcentration factors and bioaccumulation factors were also estimated with the BCFBAF v3.01 model. The estimated log BCF value for the ten most abundant individual structures of the substance ranged from 2.02 to 3.08 (BCF 105 to 1202 L/kg). In conclusion, as the estimated BCF values are less than B or vB criteria (2000 and 5000 L/kg) this substance is not bioaccumulative or very bioaccumulative. Toxic: The substance is toxic as this substance is classified as carcinogenic, mutagenic and toxic for reproduction. Overall conclusions: The criteria for PBT are not met.
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.

Additional information : Flammable vapours may accumulate in the container.

SECTION 14: Transport information

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

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 3295	UN 3295	UN 3295	UN 3295	UN 3295
14.2. UN proper shipping name				
HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.	Hydrocarbons, liquid, n.o.s.	HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.

ADR	IMDG	IATA	ADN	RID
Transport document description				
UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 3295 Hydrocarbons, liquid, n.o.s., 3, II, ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, ENVIRONMENTALLY HAZARDOUS	UN 3295 HYDROCARBONS, LIQUID, N.O.S., 3, II, ENVIRONMENTALLY HAZARDOUS
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
II	II	II	II	II
14.5. Environmental hazards				
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR)	:	F1
Special provisions (ADR)	:	640D
Limited quantities (ADR)	:	1l
Excepted quantities (ADR)	:	E2
Packing instructions (ADR)	:	P001, IBC02, R001
Mixed packing provisions (ADR)	:	MP19
Portable tank and bulk container instructions (ADR)	:	T7
Portable tank and bulk container special provisions (ADR)	:	TP1, TP8, TP28
Tank code (ADR)	:	LGBF
Vehicle for tank carriage	:	FL
Transport category (ADR)	:	2
Special provisions for carriage - Operation (ADR)	:	S2, S20
Hazard identification number (Kemler No.)	:	33
Orange plates	:	
Tunnel restriction code (ADR)	:	D/E
EAC code	:	3YE

Transport by sea

Limited quantities (IMDG)	:	1 L
Excepted quantities (IMDG)	:	E2
Packing instructions (IMDG)	:	P001
IBC packing instructions (IMDG)	:	IBC02
Tank instructions (IMDG)	:	T7
Tank special provisions (IMDG)	:	TP1, TP8, TP28
EmS-No. (Fire)	:	F-E
EmS-No. (Spillage)	:	S-D
Stowage category (IMDG)	:	B

Properties and observations (IMDG) : Immiscible with water.

Air transport

PCA Excepted quantities (IATA) : E2
PCA Limited quantities (IATA) : Y341
PCA limited quantity max net quantity (IATA) : 1L
PCA packing instructions (IATA) : 353
PCA max net quantity (IATA) : 5L
CAO packing instructions (IATA) : 364
CAO max net quantity (IATA) : 60L
Special provisions (IATA) : A3, A324
ERG code (IATA) : 3H

Inland waterway transport

Classification code (ADN) : F1
Special provisions (ADN) : 640D
Limited quantities (ADN) : 1 L
Excepted quantities (ADN) : E2
Carriage permitted (ADN) : T
Equipment required (ADN) : PP, EX, A
Ventilation (ADN) : VE01
Number of blue cones/lights (ADN) : 1
Additional information (AND) :vapor pressure at 50°C is below 110 kPa (measured) hazards: 3 + N2 + CMR

Rail transport

Classification code (RID) : F1
Special provisions (RID) : 640D
Limited quantities (RID) : 1L
Excepted quantities (RID) : E2
Packing instructions (RID) : P001, IBC02, R001
Mixed packing provisions (RID) : MP19
Portable tank and bulk container instructions (RID) : T7
Portable tank and bulk container special provisions (RID) : TP1, TP8, TP28
Tank codes for RID tanks (RID) : LGBF
Transport category (RID) : 2
Colis express (express parcels) (RID) : CE7
Hazard identification number (RID) : 33

14.7. Maritime transport in bulk according to IMO instruments

Transport in Bulk (MARPOL 73/78, Annex I): Energy-rich fuels. Alkanes C4-C12 linear, branched and cyclic. This cargo is considered an Energy-rich fuel and effective 1 January 2019 should be carried subject to Annex I of MARPOL, see Annex 12 of MEPC.2/Circ.24

SECTION 15: Regulatory information

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

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(a)	UPM BIOVERNO NAPHTHA	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 classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F

EU restriction list (REACH Annex XVII)		
Reference code	**Applicable on**	**Entry title or description**
3(b)	UPM BIOVERNO NAPHTHA	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 classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10
3(c)	UPM BIOVERNO NAPHTHA	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
40.	UPM BIOVERNO NAPHTHA	Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.

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 2, Significantly 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.

Chemicals Prohibition Ordinance (ChemVerbotsV) : This product is subject to ChemVerbotsV Annex 2 Entry 1. The following requirements must be observed: authorization requirement (according to § 6 paragraph 1 sentence 1), basic requirements for carrying out the delivery (according to § 8 paragraph 1, 3 and 4), identification and documentation (according to § 9 paragraph 1 to 3) and exclusion of the shipping route (according to § 10).

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

Netherlands

ABM category	:	A(2) - toxic 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
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling	:	The substance is not listed

Denmark

Class for fire hazard	:	Class I-1
Store unit	:	1 liter
Classification remarks	:	F <Flam. Liq. 2>; 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 Pregnant/breastfeeding women working with the product must not be in direct contact with the product

Switzerland

Storage class (LK)	:	LK 3 - Flammable liquids
Chemicals Ordinance (SR 813.11)	:	Group 1

15.2. Chemical safety assessment

In accordance with Regulation (EC) No. 1907/2006 (REACH) Article 14, a Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Indication of changes:
Version 8.0: 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

Abbreviations and acronyms:	
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
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 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 1B	Carcinogenicity, Category 1B
Flam. Liq. 2	Flammable liquids, Category 2
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H411	Toxic to aquatic life with long lasting effects.
Muta. 1B	Germ cell mutagenicity, Category 1B
Repr. 2	Reproductive toxicity, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Narcosis

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.

Annex to extended Safety Data Sheet

Table of Contents

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

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

Half-life – Sediment	6.2 – 220 d
Half-life - Wastewater	0.17 – 9.5 h
Amounts used	
Annual use at a site:	**Distribution**: ≤ 30 tonnes/year **Intermediate**: ≤ 15 000 tonnes/year **Formulation**: ≤ 1500 tonnes/year
Daily use at a site:	**Distribution**: ≤ 0.1 tonnes/day (SPERC default emission days 300 d/year) **Intermediate**: ≤ 50 tonnes/day (SPERC default emission days 300 d/year) **Formulation**: ≤ 5 tonnes/day (SPERC default emission days 300 d/year)
Frequency and duration of use	
Continuous use/release (used > 12 times per year). Intermittent releases not evaluated.	
Environment factors not influenced by risk management	
Dilution factor - freshwater:	10
Dilution factor – marine:	100
Other given operational conditions affecting environmental exposure	
The environmental emission assessment is based on SPERC developed by ESIG/ESVOC. Substance losses are reduced through use of general and site-specific risk management measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs; and through use of closed or covered equipment/processes to minimize evaporative losses of VOCs. Substance losses to waste water are generally restricted to equipment cleaning as processes operate without contact with water. Such uses and substance properties result in limited to no discharge to wastewater or to soil from the industrial site.	
Technical conditions and measures at process level (source) to prevent release **Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil**	
Containment	Process optimized for efficient use of raw materials (minimal environmental release). Volatile compounds subject to air emission controls. Negligible wastewater emissions as process operates without water contact. Negligible air emissions as process operates in a contained system. Wastewater emission generated from equipment cleaning with water. Emission factors to wastewater are based on water solubility. Assumes no free product in wastewater stream; oil-water separation (e.g. *via* oil water separators, oil skimmers, dissolved air floatation) may be required under some circumstances.
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	

Emission factor	Distribution	Intermediate	Formulation
water	0.001 %	0.03 %	0.02 %
air (final)	0.01 %	0.5 %	2.5 %
soil	0.001 %	0.1 %	0.01 %

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

Conditions and measures related to municipal sewage treatment plant

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

Conditions and measures related to external treatment of waste for disposal

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

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

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

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

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

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

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

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

General process exposures - closed continuous process (with sampling)	PROC 2	< 8 h	Indoor	≤ 40 °C
General process exposures - closed batch process (with sampling)	PROC 3	< 8 h	Indoor	≤ 40 °C
Laboratory activities	PROC 15	< 8 h	Indoor	≤ 40 °C

Technical conditions and measures at process level (source) to prevent release Organisational measures to prevent /limit releases, dispersion and exposure		
Occupational Health and Safety Management System: Advanced		
Contributing scenario	PROC	Level of containment
Equipment cleaning and maintenance	PROC 8a	No containment
Bulk loading and unloading	PROC 8b	Semi-closed process with occasional controlled exposure
General process exposures - closed process (no sampling)	PROC 1	Closed system (minimal contact during routine operations)
General process exposures - closed continuous process (with sampling)	PROC 2	Closed continuous process with occasional controlled exposure
General process exposures - closed batch process (with sampling)	PROC 3	Closed batch process with occasional controlled exposure
Laboratory activities	PROC 15	No containment

Technical conditions and measures to control dispersion from source towards the worker			
Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation **or operation undertaken outdoors*
Equipment cleaning and maintenance - indoor	PROC 8a	Yes (90 %): *LEV or SOP (eg. drain down prior to maintenance)*	Good (3-5 air changes per hour)
Equipment cleaning and maintenance - outdoor	PROC 8a	Yes (90 %): *LEV or SOP (eg. drain down prior to maintenance)*	not applicable
Bulk loading and unloading	PROC 8b	Yes (90 %): *Material transfers under containment or extract ventilation*	not applicable
General process exposures - closed process (no sampling)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*
General process exposures - closed continuous process (with sampling)	PROC 2	Yes (90 %): *LEV / closed or semi-closed sampling points*	Good (3-5 air changes per hour)*
General process exposures - closed batch process (with sampling)	PROC 3	Yes (90 %): *LEV / closed or semi-closed sampling points*	Good (3-5 air changes per hour)*
Laboratory activities	PROC 15	Yes (90 %): *LEV*	Good (3-5 air changes per hour)

Conditions and measures related to personal protection, hygiene and health evaluation				
Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Equipment cleaning and maintenance – indoor / outdoor	PROC 8a	1. No (0 %) *duration < 1 h* 2. Yes (90 %) *duration < 8 h*	Eye protection: Goggles or safety glasses with side shields (EN166) *Eye protection where there is potential for exposure.* (PROC1: good practice advice, see below)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Bulk loading and unloading	PROC 8b	No (0 %)		
General process exposures - closed process (no sampling)	PROC 1	No (0 %)		
General process exposures - closed continuous process (with sampling)	PROC 2	No (0 %)		
General process exposures - closed batch process (with sampling)	PROC 3	No (0 %)		

Laboratory activities	PROC 15	No (0 %)		

Additional good practise advice beyond the REACH CSA

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

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

Environment

Local exposure estimation and risk characterisation

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

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

Risk characterisation for man via the environment

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

Worker exposure

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

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

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m^3)	RCR	Estimate (mg/kg bw/day)	RCR	
Equipment cleaning and maintenance - indoor	1. PROC 8a (< 1 h, no RPE) 2. PROC 8a (< 8 h, RPE)	1.139 0.57	0.351 0.175	0.055 0.274	<0.01 0.001	0.351 0.175
Equipment cleaning and maintenance - outdoor	1. PROC 8a (< 1 h, no RPE) 2. PROC 8a (< 8 h, RPE)	1.139 0.5696	0.351 0.175	0.055 0.274	<0.01 0.001	0.351 0.175
Bulk loading and unloading	PROC 8b	2.05	0.631	0.164	<0.01	0.631
General process exposures - closed process (no sampling)	PROC 1	0.002	<0.001	6.8E-4	<0.01	< 0.01
General process exposures - closed continuous process (with sampling)	PROC 2	0.57	0.175	0.027	<0.01	0.175
General process exposures - closed batch process (with sampling)	PROC 3	1.139	0.351	0.014	<0.01	0.351
Laboratory activities	PROC 15	1.139	0.351	0.007	<0.01	0.351

Qualitative assessment

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

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

Environment

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

Human health exposure

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

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

This exposure scenario does not address consumers or professional workers.

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

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

Dilution factor – marine:	100

Other given operational conditions affecting environmental exposure

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

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

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

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

Environmental compartment	Emission factor
water	0.07 %
air (final)	9.8 %
soil	0 %

Organizational measures to prevent/limit release from site

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

Conditions and measures related to municipal sewage treatment plant

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

Conditions and measures related to external treatment of waste for disposal

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

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

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

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

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

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

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

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

Technical conditions and measures at process level (source) to prevent release
Organisational measures to prevent /limit releases, dispersion and exposure

Occupational Health and Safety Management System: Advanced

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

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

Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation

Transfer from/pouring from containers (manual), cleaning and maintenance	PROC 8a	Yes (90 %): *LEV or SOP (eg. drain down prior to maintenance)*	Good (3-5 air changes per hour)
Bulk transfers, material transfers	PROC 8b	Yes (95 %): *Material transfers under containment or extract ventilation*	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	1. Yes (90 %): *LEV* 2. No (0 %)	1. Good (3-5 air changes per hour) 2. Enhanced (5-10 air changes per hour)
General batch process exposures	PROC 3	Yes (90 %): *LEV*	Good (3-5 air changes per hour)
Laboratory activities	PROC 15	Yes (90 %): *LEV*	Good (3-5 air changes per hour)

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

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

Additional good practise advice beyond the REACH CSA

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

Housekeeping: General good hygiene and housekeeping

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

3. Exposure estimation and reference to its source

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

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

Environment

Local exposure estimation and risk characterisation

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

Protection target	Environmental Exposure	Protection target	Environmental Risk
PEC effluent (mg/L)	7.5E-02	RCR effluent	1.3E-02
PEC freshwater (mg/L)	7.5E-03	RCR freshwater	2.0E-02
PEC marine (mg/L)	7.5E-04	RCR marine	2.0E-03

PEC freshwater sediment (mg/kg ww)	5.2E-02	RCR freshwater sediment	2.2E-02
PEC marine sediment (mg/kg ww)	5.2E-03	RCR marine sediment	2.2E-03
PEC agricultural soil (mg/kg ww)	5.9E-04	RCR agricultural soil	1.0E-03

Risk characterisation for man via the environment

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

Worker exposure

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

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

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m³)	RCR	Estimate (mg/kg bw/day)	RCR	
Transfer from/pouring from containers (manual), cleaning and maintenance	1. PROC 8a (< 1 h, no RPE) 2. PROC 8a (< 8 h, RPE in use)	1.139 0.57	0.351 0.175	0.055 0.274	<0.01 0.001	0.351 0.175
Bulk transfers, material transfers	PROC 8b	1.709	0.526	0.274	0.001	0.526
General process exposures - closed process	PROC 1	0.002	<0.001	6.8E-4	<0.01	<0.01
Film formation - force drying	1. PROC 2 (Good ventilation + LEV) 2. PROC 2 (Enhanced ventilation)	0.57 2.441	0.175 0.751	0.027 0.027	<0.01 <0.01	0.175 0.751
General batch process exposures	PROC 3	1.139	0.351	0.014	<0.01	0.351
Laboratory activities	PROC 15	1.139	0.351	0.007	<0.01	0.351

Qualitative assessment

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

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

Environment

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

Human health exposure

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

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

This exposure scenario does not address consumers or professional workers.

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

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

Dilution factor – marine:	100

Other given operational conditions affecting environmental exposure

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

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

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

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

Environmental compartment	Emission factor
water	0.001 %
air (final)	0.25 %
soil	0 %

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

Organizational measures to prevent/limit release from site

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

Conditions and measures related to municipal sewage treatment plant

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

Conditions and measures related to external treatment of waste for disposal

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

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

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

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

Technical conditions and measures at process level (source) to prevent release
Organisational measures to prevent /limit releases, dispersion and exposure

Occupational Health and Safety Management System: Advanced

Contributing scenario	PROC	Level of containment
Cleaning and maintenance (vehicles, boilers, storage tanks) - indoor/outdoor	PROC 8a	No containment
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	Semi-closed process with occasional controlled exposure

General use exposures as a fuel (no sampling)	PROC 1	Closed system (minimal contact during routine operations)		
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	Closed continuous process with occasional controlled exposure		
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	Closed batch process with occasional controlled exposure		
Use as a fuel. Use as a fuel additive diluent.	PROC 16	Closed system (minimal contact during routine operations)		
Technical conditions and measures to control dispersion from source towards the worker				
Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation **or operation undertaken outdoors*	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (90 %): *LEV or SOP (eg. drain down prior to maintenance)*	Good (3-5 air changes per hour)	
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (90 %): *LEV or SOP (eg. drain down prior to maintenance)*	not applicable	
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	Yes (95 %): *Material transfers under containment or extract ventilation*	Good (3-5 air changes per hour) (*indoor*)	
General use exposures as a fuel (no sampling)	PROC 1	No (0 %)	Good (3-5 air changes per hour)*	
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	Yes (90 %): *LEV*	Good (3-5 air changes per hour)*	
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	1. Yes (90 %): *LEV* 2. No (0 %)	Good (3-5 air changes per hour)*	
Use as a fuel. Use as a fuel additive diluent.	PROC 16	1. Yes (90 %): *LEV* 2. No (0 %)	Good (3-5 air changes per hour)*	
Conditions and measures related to personal protection, hygiene and health evaluation				
Contributing scenario	PROC	Respiratory Protection (RPE) (Effectiveness Inhal: %)	Eye/face protection:	Dermal protection
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. No (0 %) *duration < 1 h* 2. Yes (90 %) *duration < 8 h*	Eye protection: Goggles or safety glasses with side shields (EN166) *Eye protection where there is potential for exposure.* (PROC1, PROC16: good practice advice)	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. No (0 %) *duration < 1 h* 2. Yes (90 %) *duration < 8 h*		
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	PROC 8b	No (0 %)		
General use exposures as a fuel (no sampling)	PROC 1	No (0 %)		
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	No (0 %)		
General exposures closed batch system (eg. In-line additive dosing equipment)	PROC 3	1. No (0 %) *LEV in use* 2. Yes (90 %) *no LEV in use*		
Use as a fuel. Use as a fuel additive diluent.	PROC 16	1. No (0 %) *LEV in use* 2. Yes (90 %) *no LEV in use*		

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 chracterisation by RCR are derived for representative structures that are used to simulate the UVCB substance. The sum of all individual RCR values indicates the overall risk for the substance as the environmental effects of the individual components are considered additive. RCR = PEC/PNEC, RCR value below 1 indicates safe use. PNEC determined by the PETRORISK tool for each representative constituent, range of PNEC values: PNECwastewater= 13 µg/L to 34 000 µg/L, PNECaquatic= 0.88 µg/L to 2100 µg/L, PNECsoil= 0.13 mg/kg ww to 2.7 mg/kg ww, PNECsediment= 0.33 mg/kg ww to 6.7 mg/kg ww. The environmental emission assessment is based on SPERC developed by ESIG/ESVOC.
Worker: CHESAR v. 2.2 - ECETOC TRA v. 3. RCR = Exposure estimate/DMEL, RCR value below 1 indicates safe use. Semi-quantitative assessment: long-term systemic effects (inhalation, dermal). Qualitative assessment: skin irritation, aspiration toxicity, and carcinogenic effects.

Environment			
Local exposure estimation and risk characterisation			
The predicted exposure concentrations (PEC) and risk characterisation ratios (RCR) are reported in the following table.			
Protection target	Environmental Exposure	Protection target	Environmental Risk
PEC effluent (mg/L)	1.1E-03	RCR effluent	1.8E-04
PEC freshwater (mg/L)	1.1E-04	RCR freshwater	2.8E-04
PEC marine (mg/L)	1.1E-05	RCR marine	2.8E-05
PEC freshwater sediment (mg/kg ww)	7.4E-04	RCR freshwater sediment	3.2E-04
PEC marine sediment (mg/kg ww)	7.4E-05	RCR marine sediment	3.2E-05
PEC agricultural soil (mg/kg ww)	1.5E-05	RCR agricultural soil	2.6E-05
Risk characterisation for man via the environment			
Exposure estimation and risk characterisation was conducted quantitatively with the PETRORISK tool for indirect human exposure (inhalation, oral). According to modelling results, the estimated exposure level is low (combined RCR < 0.01).			
Worker exposure			
Quantitative assessment (long-term, systemic effects, inhalation and dermal route)			
Estimated exposure via inhalation and dermal route and the corresponding risk characterisation ratios (RCR) are reported in the below table. Combined RCR = inhalation + dermal. DMEL(inhalation) = 3.25 mg/m³, DMEL(dermal) = 234 mg/kg bw/day.			

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m³)	RCR	Estimate (mg/kg bw/day)	RCR	
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	1. PROC 8a (< 1 h, no RPE) 2. PROC8a (< 8 h, RPE)	1.139 0.57	0.351 0.175	0.055 0.274	<0.01 0.001	0.351 0.175
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	1. PROC 8a (< 1 h, no RPE) 2. PROC8a (< 8 h, RPE)	1.139 0.5696	0.3505 0.1752	0.055 0.274	<0.01 0.001	0.351 0.175
Bulk transfers (barge, rail and road). Transfers from drums and containers. Refueling vehicles.	1. PROC 8b (indoor) 2. PROC 8b (outdoor)	1.709 1.709	0.526 0.526	0.274 0.274	0.001 0.001	0.527 0.527
General use exposures as a fuel (no sampling)	PROC 1	0.002	<0.001	6.8E-4	<0.01	<0.01
General use exposures as a fuel (eg. In-line additive dosing equipment)	PROC 2	0.57	0.175	0.027	<0.01	0.175
General exposures closed batch system (eg. In-line additive dosing equipment)	1. PROC 3 (with LEV) 2. PROC3 (with RPE)	1.139 1.139	0.351 0.351	0.014 0.014	<0.01 <0.01	0.351 0.351
Use as a fuel. Use as a fuel additive diluent.	1. PROC 16 (with LEV) 2. PROC 16 (with RPE)	0.57 0.57	0.175 0.175	0.007 0.007	<0.01 <0.01	0.175 0.175

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

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

Human health exposure
The exposure assessment and risk characterization for inhalation exposure of workers was conducted by using Tier 1 ECETOC TRA v.3 model. The assessment indicates safe use when the recommended operational conditions and risk management measures are in use. Scaling of worker exposure can be done by using ECETOC TRA v.3 model by modifying the operational conditions. Compliance can also be verified by monitoring, and by comparing the monitored level with the DMEL value. The use is considered safe if the measured emissions divided by the DMEL–value is resulting in a risk characterisation ratio (RCR) less than 1. This exposure scenario does not address consumers or professional workers.

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

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

Other given operational conditions affecting environmental exposure

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

Some disposal via wastewater assumed. As a default, wastewaters are treated off site (municipal STP) and sludge is applied to agricultural soil. Obligatory RMM are not assumed for wide dispersive uses.

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

Containment	Professional product use leading to emission of volatiles to air. Professional product use leading to disposal via the wastewater. No obligatory onsite RMMs assumed.

Environmental compartment	Emission factor
water	0.001 %
air (final)	1 %
soil	0.001 %

Technical measures to reduce releases to air	None (Professional product use with limited or no technical control of emission).
Technical measures to reduce releases to water	Off-site waste water treatment (municipal STP)
Technical measures to reduce releases to soil	-

Organizational measures to prevent/limit release from site

General good hygiene and housekeeping.

Conditions and measures related to municipal sewage treatment plant

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

Conditions and measures related to external treatment of waste for disposal

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

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

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

Conditions and measures related to external recovery of waste

Not relevant.

2.2 Control of workers exposure

Product characteristic

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

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

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

Contributing scenario	PROC	duration	place of use	temperature
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	1. < 15 min 2. < 8 h	Indoor	≤ 40 °C
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	1. < 1 h 2. < 8 h	Outdoor	≤ 40 °C
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	< 1 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (no likelihood of exposure)	PROC 1	< 8 h	1. Indoor 2. Outdoor	≤ 40 °C
General use exposures as a fuel (occasional exposure)	PROC 2	1. < 8 h 2. < 1 h	Indoor	≤ 40 °C
Use as a fuel	PROC 16	1. < 8 h 2. < 1 h	1. Indoor 2. Outdoor	≤ 40 °C

Technical conditions and measures at process level (source) to prevent release Organisational measures to prevent /limit releases, dispersion and exposure

Occupational Health and Safety Management System: Basic

Contributing scenario	PROC	Level of containment
Cleaning and maintenance (vehicles, boilers, storage tanks) - indoor/outdoor	PROC 8a	No containment
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	Semi-closed process with occasional controlled exposure
General use exposures as a fuel (no likelihood of exposure)	PROC 1	Closed system (minimal contact during routine operations)
General use exposures as a fuel (occasional exposure)	PROC 2	Closed continuous process with occasional controlled exposure
Use as a fuel	PROC 16	Closed system (minimal contact during routine operations)

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

Contributing scenario	PROC	Local exhaust ventilation / other RMM (Eff. Inhal: %)	General ventilation
Cleaning and maintenance (vehicles, boilers, storage tanks)- indoor	PROC 8a	Yes (80 %): *LEV or SOP (eg. drain down prior to maintenance)*	Good (3-5 air changes per hour)
Cleaning and maintenance (vehicles, boilers, storage tanks)- outdoor	PROC 8a	Yes (80 %): *LEV or SOP (eg. drain down prior to maintenance)*	not applicable

Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	PROC 8b	Yes (90 %): *Material transfers under containment or extract ventilation*	Good (3-5 air changes per hour) (*indoor*)
General use exposures as a fuel (no likelihood of exposure)	PROC 1	No (0 %)	Good (3-5 air changes per hour) (*indoor*)
General use exposures as a fuel (occasional exposure)	PROC 2	1. Yes (80 %): *LEV or use under containment* 2. No (0 %)	Good (3-5 air changes per hour)
Use as a fuel	PROC 16	1. Yes (80 %): *LEV or use under containment* 2. No (0 %)	Good (3-5 air changes per hour) (*indoor*)

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

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

Additional good practise advice beyond the REACH CSA

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

Housekeeping: General good hygiene and housekeeping

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

PROC16: Dermal Protection: Yes (chemically resistant gloves conforming to EN374)

3. Exposure estimation and reference to its source

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

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

Environment

Local exposure estimation and risk characterisation

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

Protection target	Environmental Exposure	Protection target	Environmental Risk
PEC effluent (mg/L)	4.4E-07	RCR effluent	7.5E-08
PEC freshwater (mg/L)	3.5E-07	RCR freshwater	1.1E-06

PEC marine (mg/L)	4.4E-09	RCR marine	1.2E-08
PEC freshwater sediment (mg/kg ww)	1.3E-06	RCR freshwater sediment	4.9E-07
PEC marine sediment (mg/kg ww)	3.0E-08	RCR marine sediment	1.3E-08
PEC agricultural soil (mg/kg ww)	1.0E-07	RCR agricultural soil	1.0E-07

Risk characterisation for man via the environment

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

Worker exposure

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

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

Contributing scenario	PROC	Inhalation		Dermal		Combined RCR
		Estimate (mg/m³)	RCR	Estimate (mg/kg bw/day)	RCR	
Cleaning and maintenance (vehicles, boilers, storage tanks)-indoor	1. PROC 8a (duration < 15 min) 2. PROC 8a (duration < 8 h, RPE)	2.278 2.278	0.701 0.701	0.027 0.274	<0.01 0.001	0.701 0.701
Cleaning and maintenance (vehicles, boilers, storage tanks)-outdoor	1. PROC 8a (duration < 1 h) 2. PROC 8a (duration < 8 h, RPE)	2.278 1.139	0.701 0.351	0.055 0.274	<0.01 0.001	0.701 0.351
Bulk transfers. Transfers from drums and containers. Refuelling vehicles.	1 .PROC 8b (indoor) 2. PROC 8b (outdoor)	1.139 1.139	0.351 0.351	0.055 0.055	<0.01 <0.01	0.351 0.351
General use exposures as a fuel (no likelihood of exposure)	1 .PROC 1 (indoor) 2. PROC 1 (outdoor)	0.023 0.023	0.007 0.007	6.8E-4 6.8E-4	<0.01 <0.01	< 0.01 < 0.01
General use exposures as a fuel (occasional exposure)	1. PROC 2 (duration < 8 h, LEV) 2. PROC 2 (duration < 1 h)	2.278 2.278	0.701 0.701	0.027 0.005	<0.01 <0.01	0.701 0.701
Use as a fuel	1. PROC 16 (indoor, duration < 8 h, LEV) 2. PROC 16 (outdoor, duration < 1 h)	2.278 2.278	0.701 0.701	0.034 0.007	<0.01 <0.01	0.701 0.701

Qualitative assessment

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

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

Environment

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

Human health exposure

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

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

This exposure scenario does not address consumers or industrial workers.