Hartree®

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Relevant identified uses of the substance or mixture

Date of issue: 20th December 2023 Version: 1.0

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

1.1	Product Identifier	
	Product Name	
	Molecular formula	
	CAS No.	
	EC No.	
	REACH Registration No.	

Identified use(s)

and uses advised against

1.2

Renewable hydrocarbons C10-20H22-42 928771-01-1 700-571-2 06-2120907698-41-0000

	No.	Exposure Scenario	Page:
	1	Formulation or re-packing (Manufacture of substances and mixtures)	11
	2	Use at industrial sites (Use as Intermediate by Industry)	14
	3	Use at industrial sites (Use as a fuel)	15
	4	Use at industrial sites (Use in coatings)	17
	5	Use at industrial sites (Use in lubricants)	20
	6	Use at industrial sites (Use in functional fluids)	22
	7	Use at industrial sites (Use in water treatment)	24
	8	Widespread use by professional workers (Use as a fuel)	26
	9	Widespread use by professional workers – (Use in coatings)	28
	10	Widespread use by professional workers (Use in lubricants) – High environmental release	30
	11	Widespread use by professional workers (Use in water treatment)	32
	12	Widespread use by professional workers (Use in functional fluids)	34
	13	Widespread use by professional workers (Use in functional fluids)	36
	14	Widespread use by professional workers (Use in explosive manufacturing and use)	38
	15	Consumer use – Uses in coatings	40
	16	Consumer use – Use as a fuel	46
	17	Consumer use – Use in Functional	48
	18	Consumer use – Use in lubricants	50
	Anyth	ing other than the above.	
a sheet			
	HART 2 nd Fl Londo SW18	FREE PARTNERS (UK) LIMITED oor, Cardinal Place 100 Victoria Street on E 5JL	

Uses advised against

1.3 Details of the supplier of the safety data sheet Company Identification

Telephone E-mail (competent person)

Only representative of a non-Community manufacturer Company Identification

Telephone E-mail (competent person)

1.4 Emergency Telephone Number Emergency Phone No. Language(s) spoken: Ireland Poison Center

+32 3 575 11 30 (SGS Emergency Hotline) 24 hours, English spoken

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Renewable hydrocarbons

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ACCO	PRDING TO EC-REGULATIONS 1907/2006 (REACH),	1272/2008 (CLP) & 2020/878	Date of issue: 20 th December 2023 Version: 1.0
	Emergency Phone No. Language(s) spoken:	+353 1 809 2566 (Healthcare Professionals) +353 1 809 2166 (Members of Public) English	24 hours / 7 days Office hours: 8am - 10pm, 7 days per week
SECT	ION 2: HAZARDS IDENTIFICATION		
2.1	Classification of the substance or mixture Regulation (EC) No. 1272/2008 (CLP)	Asp. Tox. 1; H304	
2.2	Label elements Product name CAS No. EINECS No. Hazard Pictogram(s)	Renewable hydrocarbons 928771-01-1 700-571-2	
	Signal Word(s)	DANGER	
	Hazard Statement(s)	H304: May be fatal if swallowed and en	ters airways.
	Precautionary Statement(s)	P301+P310: IF SWALLOWED: Immedia P331: Do NOT induce vomiting.	ately call a POISON CENTER/doctor/
	Supplemental information	EUH066: Repeated exposure may cause	se skin dryness or cracking.
2.3	Other hazards	None known	
SECT	ION 3: COMPOSITION/INFORMATION ON	INGREDIENTS	

3.1 Substances

SUBSTANCE	CAS No.	EC No.	REACH Registration No.	%W/W
Renewable hydrocarbons	928771-01-1	700-571-2	06-2120907698-41-0000	100

3.2 Mixtures

Not applicable

SECTION 4: FIRST AID MEASURES



4.1 Description of first aid measures Self-protection of the first aider

Inhalation

Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Avoid breathing mist/vapours/spray. Contaminated clothing should be laundered before reuse.

IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if necessary. Apply artificial respiration only if patient is not breathing. In the event of cardiac arrest apply external cardiac massage. Obtain medical attention.

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Hartree

	Skin contact	IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing
		and wash it before reuse. If symptoms persist, obtain medical attention.
	Eve contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact
	Lycoondor	longes if present and easy to de Continue ringing. Seek medical attention if
		ienses, il present and easy to do. Continue finsing. Seek medical attention il
		irritation persists.
	Ingestion	IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the
		lungs. If vomiting occurs spontaneously, keep head below hips to prevent
		aspiration into the lungs. Never give anything by mouth to an unconscious person
		Cook immediate medical ettention
		Seek Immediate medical attention.
4.2	Most important symptoms and effects, both acute	Irritation of the respiratory tract. Repeated exposure may cause skin dryness or
	and delaved	cracking. May cause diarrhoea and nausea. May be fatal if swallowed and
	· · · · · · · · · · · · · · · · · · ·	enters ainways
4.3	Indication of any immediate medical attention and	Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

special treatment needed

- 5.1 Extinguishing media Suitable extinguishing media Unsuitable extinguishing media
- 5.2 Special hazards arising from the substance or mixture
- 5.3 Advice for firefighters

As appropriate for surrounding fire. Use water, CO2, dry chemical, or foam Do not use water jet. Direct water jet may spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and Caution - spillages may be slippery. Evacuate the area and keep personnel emergency procedures upwind. Ensure operatives are trained to minimise exposures. Eliminate sources of ignition. Ensure suitable personal protection during removal of spillages. Shut off leaks if without risk. Ensure adequate ventilation. Avoid breathing mist/vapours/spray. Do not ingest. Use personal protective equipment as required. Take off contaminated clothing and wash it before reuse. 6.2 **Environmental precautions** Avoid release to the environment. Do not allow to enter drains, sewers or water courses. 6.3 Methods and material for containment and cleaning Provided it is safe to do so, isolate the source of the leak. Clean up spill up immediately. Absorb spillage in earth, sand, or any suitable absorbent material. Transfer to a container for disposal or recovery. Ventilate the area and wash spill site after material pick-up is complete. 6.4 Reference to other sections See Section: 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1	Precautions for safe handling	Ensure operatives are trained to minimise exposures. When using do not eat or drink. Take precautionary measures against static discharge. Bund storage facilities to prevent soil and water pollution in the event of spillage. Containers of this material may be hazardous when empty since they retain product residue. Do not cut, drill, grind, weld on or near this container. Ensure adequate ventilation. Avoid breathing mist/vapours/spray. Avoid splashing. Do not ingest. Use personal protective equipment as required. Take off contaminated clothing and wash it before reuse.
7.2	Conditions for safe storage, including any incompatibilities	Keep only in the original container. Store in a cool/low-temperature, well- ventilated (dry) place away from heat and ignition sources. Do not use or store near heat or open flame. Protect from direct sunlight. Keep away from food, drinks and animal food.
	Storage temperature	Store at ambient temperature.

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Incompatible materials

7.3 Specific end use(s)

Keep away from: Strong oxidising agents. See Section: 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

- 8.1.1 Occupational exposure limits
- 8.1.2 Biological limit value

Not established

8.1.3 PNECs and DNELs

Predicted No Effect Concentration	Value
Aquatic Compartment	PNEC Water (freshwater) 0.01 mg/L
	PNEC Water (marine water) 0.01 mg/L
	PNEC Water (freshwater sediment) 3810 mg/kg dw
	PNEC Water (marine water sediment) 3.73 mg/kg dw
Soil	PNEC Soil 761 mg/kg dw
STP (sewage treatment plant)	PNEC STP 10 mg/L

Renewable hydrocarbons Derived No- Effect Level	Oral	Inhalation	Dermal
Worker - Long Term - Systemic effects	-	147 mg/m³	42 mg/kg bw/day
Consumer - Long Term - Systemic effects	18 mg/kg bw/day	94 mg/m³	18 mg/kg bw/day

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Ensure adequate ventilation. Store in a cool/low-temperature, well-ventilated (dry) place away from heat and ignition sources.

8.2.2 Individual protection measures, such as personal protective equipment

Use personal protective equipment as required. Keep good industrial hygiene. Do not eat, drink or smoke at the work place. Avoid breathing mist/vapours/spray. Avoid splashing. Do not ingest.

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.



Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties Liquid Dhysical state

Fliysical state	Liquiu
Colour	Colourless
Odour	Characteristic
Melting point/freezing point	-20 °C at 1 atm
Boiling point or initial boiling point and boiling range	242 °C at 1 atm
Flammability	Non-flammable.
Lower and upper explosion limit	Not established
Flash point	64 °C at 1013 hPa
Auto-ignition temperature	204 °C at 1013 hPa
Decomposition temperature	Not established
рН	5.3 – 6.3
Kinematic viscosity	2.6 mm ² /s at 40 °C
Solubility	0.075 mg/L at 25 °C
	Insoluble in water
Partition coefficient: n-octanol/water (log value)	Log KOW = 8.4 at 20 °C
Vapour pressure	87.1 Pa at 25 °C
Density and/or relative density	0.772 at 20 °C
Relative vapour density	Not established
Particle characteristics	Not established

9.2 Other information

None known

SECTION 10: STABILITY AND REACTIVITY

10.1 F	Reactivity
--------	------------

11.1

- 10.2 **Chemical stability**
- 10.3 Possibility of hazardous reactions
- 10.4 Conditions to avoid
- 10.5 Incompatible materials
- 10.6 Hazardous decomposition products

Stable under normal conditions Stable under normal conditions None anticipated. Hazardous polymerisation will not occur. Avoid high temperatures or direct sunlight. Keep away from: Strong oxidising agents. Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on hazard classes as defined in	
Regulation (EC) No 1272/2008	
Acute toxicity - Ingestion	Based upon the available data, the classification criteria are not met.
	LD50 (oral,rat) mg/kg: >2000 (EU Method B.1) (Mullaney, 2005)
Acute toxicity - Inhalation	Based upon the available data, the classification criteria are not met.
	LC50 (inhalation,rat) mg/l/4h: 4467 (OECD 403) (Nilsen, Haugen & Zaglsen, 1988)
Acute toxicity - Skin contact	Based upon the available data, the classification criteria are not met.
-	LD50 (skin,rat) mg/kg: >2000 (EU Method B.3) (Sanders, 2006)
Skin corrosion/irritation	Based upon the available data, the classification criteria are not met.
	Not irritating to skin (rabbit) (EU Method B.4) (Sanders, 2007)
Serious eye damage/irritation	Based upon the available data, the classification criteria are not met.
	Reversible effects on the eye (rabbit) (EU Method B.5) (Sanders, 2007)
Respiratory or skin sensitisation	Based upon the available data, the classification criteria are not met.
	Sensitisation (guinea pig) – Negative (EU Method B.6) (Richeux, 2008)
Germ cell mutagenicity	Based upon the available data, the classification criteria are not met.
	Mutagenicity – Negative (bacteria) (EU Method B.13/14) (Thompson, 2005)
Carcinogenicity	Based upon the available data, the classification criteria are not met.
	No data available
Reproductive toxicity	Based upon the available data, the classification criteria are not met.
-	Reproductive toxicity: Negative (rat) (OECD 416) (Dhinsa, Brooks & Watson 2009)

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Hartree® Date of issue: 20th December 2023

Version: 1.0

		NOAEL = 1000 mg/kg bw/day
		Developmental toxicity: Negative (rabbit) (OECD 414) (Hartman-Van Dycke,
		2020) NOAEL = 1000 ma/ka bw/day
	STOT - Single Exposure	Based upon the available data, the classification criteria are not met.
		No data available
	STOT - Repeated Exposure	Based upon the available data, the classification criteria are not met.
		NOAEL = 1000 mg/kg bw/day (rat) (OECD 408) (Dhinsa, Brooks & Watson
		2009)
	Aspiration hazard	Based upon the available data, the classification criteria are not met.
		Kinematic viscosity: 2.6 mm ² /s at 40 °C
11 2	Information on other hazards	
11 2 1	Endocrine disrupting properties	This product does not contain a substance that has endocrine disrupting
11.2.1	Endocrine disrupting properties	properties with respect to humans as no components meets the criteria
11 2 2	Other information	None known
11.2.2		
SECTIO	ON 12: ECOLOGICAL INFORMATION	
12.1	Toxicity	Based upon the available data, the classification criteria are not met.
		LL50 (48 hour): > 1000 mg/L (tish)(OECD 203) (Goodband, 2005)
		NOELR (48 hour): > 1000 mg/L (fish) ((Q)SAR) (CONCAWE, 2006)
12.2	Persistence and degradability	Readily biodegradable.

- 12.3 **Bioaccumulative potential**
- 12.4 Mobility in soil

- 12.5 Results of PBT and vPvB assessment
- 12.6 **Endocrine disrupting properties**
- 12.7 Other adverse effects

SECTION 13: DISPOSA	L CONSIDERATIONS
---------------------	------------------

13.1 Waste treatment methods Avoid release to the environment. Do not allow to enter drains, sewers or water courses. This material and its container must be disposed of as hazardous waste. Dispose of contents/container to hazardous waste collection point. Disposal should be in accordance with local, state or national legislation.

Not classified as PBT or vPvB. None of the substances in this product fulfil the

This product does not contain a substance that has endocrine disrupting properties with respect to non-target organisms as no components meets the

% Degradation: 82 (28 days) (OECD 301B) (Clarke, 2008)

Koc > 427000 (BCFWIN v2.17) (O' Connor & Woolley, 2009)

criteria for being regarded as a PBT or vPvB substance.

The substance has low potential for bioaccumulation. BCF = 116.3 (OECD 305A) (Boethling et al., 1997)

The substance has low mobility in soil.

SECTION 14: TRANSPORT INFORMATION

Not classified according to the United Nations 'Recommendations on the Transport of Dangerous Goods'.

		ADR/RID	ADN	IMDG	IATA/ICAO
14.1	UN number or ID number	Not assigned	Not assigned	Not assigned	Not assigned
14.2	UN proper shipping name	Not assigned	Not assigned	Not assigned	Not assigned
14.3	Transport hazard class(es)	Not assigned	Not assigned	Not assigned	Not assigned
14.4	Packing group	Not assigned	Not assigned	Not assigned	Not assigned
14.5	Environmental hazards	Not classified as	Not classified as	Not classified as a	Not classified as
		Environmentally	Environmentally	Marine Pollutant.	Environmentally
		hazardous	hazardous		hazardous
		substance	substance		substance
14.6	Special precautions for user	See Section: 2			
14.7	Maritime transport in bulk according to IMO	No information	No information	No information	No information
	instruments	available.	available.	available.	available.
14.8	Additional information	None known			

criteria.

None known

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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SECTION 15: REGULATORY INFORMATION

15.1	Safety, health and environmental regulations/legislation specific for the substance or mixture	
15.1.1	EU regulations	
	Authorisations and/or restrictions on use	Not restricted
	To follow:	Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work
15.1.2	National regulations	
	Germany	Water hazard class: nwg (Self classification)

15.2 **Chemical Safety Assessment**

workers from the risks related to chemical agents at work Water hazard class: nwg (Self classification) A REACH chemical safety assessment (CSA) has been carried out. Refer to

annexes for exposure scenarios detailing use specific exposure controls.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: Not applicable – V1.0

References:

Existing Safety Data Sheet (SDS).

Existing ECHA registration(s) for Renewable hydrocarbons (EC No. 700-571-2) and Chemical Safety Report.

Literature References:

- 1. Boethling RS, Meylan WM, Howard PH, Aronson D, Printup H abd Gouchie S 1997: Improved Method for Estimating Bioconcentration Factor (BCF) from Octanol/Water Partition Coefficient (publication), SRC TR-97- 006 2nd Update.
- Clarke, N 2008: NExBTL Biodiesel: Assessment of ready biodegradability; CO2 evolution test (study report), Testing laboratory: 2. Safepharm Laboratories Ltd., Shardlow Business Park, Shardlow, Derbyshire DE72 2GD UK, Report no: 2106/0028. Owner company; Neste Oil Ovi.
- 3. CONCAWE 2006: PETROTOX—CONCAWE's ecotoxicity predictor for petroleum products. A user-friendly tool to assess aquatic toxicity hazard of complex petroleum and related substances (publication), CONCAWE Review, Volume 15, Number 2, Autumn 2006, pg. 16-18... Owner company; CONCAWE
- 4. Dhinsa, NK, Brooks, P and Watson, P 2009: NExBTL Renewable Diesel: oral (gavage) two generation reproduction study in the rat with evaluation of subchronic toxicity (study report), Testing laboratory: Harlan Laboratories Ltd, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK, Report no: 2106/0025. Owner company; Neste Oil Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: Dec 9, 2009
- Goodband, TJ 2005: NExBTL biodiesel, Acute toxicity to fish rainbow trout (Onchorynchus mykiss) (study report), Testing laboratory: 5. SafePharm Laboratories, Report no: 2106/0009. Owner company; Neste Oil Corporation Renewable Fuels POB 95 FI-00095 NESTE OIL (Espoo) FINLAND, Report date: Aug 30, 2005
- Hartman-Van Dycke, K.C.G. 2020: Prenatal Developmental Toxicity Study of Neste Renewable Diesel by Oral Gavage in Rats (study 6 report), Testing laboratory: Charles River Laboratories Den Bosch BV (Hambakenwetering 7, 5231 DD 's-Hertogenbosch, The Netherlands) and Charles River Laboratories Den Bosch B.V. (Nistelrooisebaan 3, 5374 RE Schaijk, The Netherlands), Report no: 20223627. Owner company; Neste Oyj (Keilaranta 21, Espoo, PL95, 00095 Neste, Finland), Report date: Nov 16, 2020
- 7. Mullaney, T 2005: Acute oral toxicity of NExBTL Biodiesel in the rat acute toxic class method (study report), Testing laboratory: SafePharm Laboratories, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK, Report no: 2106/002. Owner company; Neste Oil Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: Jul 7, 2007
- Nilsen, OG, Haugen, OA, Zaglsen, K et al. 1988: Toxicity of n-C9 to n-C13 alkanes in the rat on short term inhalation (publication), 8. Pharmacology and Toxicology 62, 259-266.
- 9. O'Connor B J, Woolley S M 2009: NExBTL renewable diesel: DETERMINATION OF GENERAL PHYSICOCHEMICAL PROPERTIES (study report), Testing laboratory: Harlan Laboratories Ltd Shardlow Business Park Shardlow Derbyshire DE72 2GD UK, Report no: 2106-0031. Owner company; Neste Oil Corporation Renewable Fuels POB 95 FI-00095 NESTE OIL (Espoo) FINLAND, Report date: Oct 29, 2009
- 10. Richeux, F 2008: NExBTL Renewable diesel. Skin sensitisation in the guinea pig Magnusson and Kligman maximisation method (study report), Testing laboratory: Phycher Bio Developpement, 33611 CESTAS Cedex, France, Report no: SMK-PH-07/0460. Owner company; Neste Oil Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: May 20, 2008
- 11. Sanders, A 2006: NExBTL Biodiesel: acute dermal toxicity (limit test) in the rat (study report), Testing laboratory: SafePharm Laboratories, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK, Report no: 2106/007. Owner company; Neste Oil Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: Oct 23, 2006
- 12. Sanders, A 2007: NExBTL Biodiesel: acute dermal irritation in the rabbit (study report), Testing laboratory: SafePharm Laboratories, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK, Report no: 2106/0021. Owner company; Neste Oil Oyi, POB 95, FI-00095, NESTE OIL, Finland, Report date: Aug 28, 2007

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Hartree

 Thompson, PW 2005: NExBTL Biodiesel: reverse mutation assay "Ames Test" using Salmonella typhimurium. (study report), Testing laboratory: SafePharm Laboratories, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK, Report no: 2106/003. Owner company; Neste Oil Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: Jul 25, 2005

EU Classification: This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Legend	
ADR	ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN	ADN: European Agreement on the International Transport of Dangerous Goods by Inland Waterways
BCF	Bioconcentration Factor
CAS	Chemical Abstracts Service
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
DNEL	Derived no effect level
EC	European Community
IATA	IATA: International Air Transport Association
ICAO	ICAO: International Civil Aviation Organization
IMDG	IMDG: International Maritime Dangerous Goods
LC50	Lethal Concentration at which 50% of the population is killed
LD50	Lethal Dose at which 50% of the population is killed
LTEL	Long term exposure limit
NOAEL	No Observed Adverse Effect Level
OECD	Organisation for Economic Cooperation and Development
PBT	PBT: Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	RID: Regulations concerning the international railway transport of dangerous goods
STEL	Short term exposure limit
UN	United Nations
vPvB	vPvB: very Persistent and very Bioaccumulative
UVCB	Unknown or Variable Composition, Complex reaction products or Biological materials
WGK	Wassergefährdungsklasse (Germany) / Water hazard class

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

Hazard classification / Classification code:

Asp. Tox. 1; Aspiration hazard, Category 1

Hazard Statement(s)

EUH066: Repeated exposure may cause skin dryness or cracking. H304: May be fatal if swallowed and enters airways.

Disclaimers

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Annex to the extended Safety Data Sheet (eSDS) See below -

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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NAME Renewable hydrocarbons

CAS No. 928771-01-1 EC No. 700-571-2

Summary of Parameters

Physical parameter	s		
Vapour pressure (hP	a)		87.1Pa at 25°C
Partition Coefficient ((log K _{ow})		Log Kow (Log Pow): 8.4 at 20°C
Solubility (Water) (m	g/l)		0.075mg/L at 25°C
Molecular weight			>142.3 - <285.5
Biodegradability			Readily biodegradable Degradation rate (%): 82 (28d) (% degradation (CO2 evolution) evolution))
Human Health (DNE	EL)		
	Long Term -	Inhalation (mg/m ³)	147mg/m³
workers	effects	Dermal (mg/kg bw/day)	42mg/kg bw/day
		Inhalation (mg/m³)	94mg/m³
Consumer	Long Term – Systemic	Dermal (mg/kg bw/day)	18mg/kg bw/day
	enecis	Oral (mg/kg bw/day)	18mg/kg bw/day
Environmental Para	ameters (PNECs)		
Freshwater (mg/L)			0.01mg/L
Marine water (mg/L	.)		0.01mg/L
Freshwater Sedime	ent (mg/kg Sedime	nt dw)	3810mg/kg Sediment dw
Marine water Sedin	nent (mg/kg Sedim	nent dw)	3.73mg/kg sediment dw
Sewage treatment	plant (mg/L)		10mg/L
Soli (mg/kg soli dw))		/o/mg/kg/soil/aw

Contents

Number Exposure scenario 1 Title

Renewable hydrocarbons

Hartree

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Exposure scenario 2	Use at industrial sites (Use as Intermediate by Industry)	14
Exposure scenario 3	Use at industrial sites (Use as a fuel)	15
Exposure scenario 4	Use at industrial sites (Use in coatings)	17
Exposure scenario 5	Use at industrial sites (Use in lubricants)	20
Exposure scenario 6	Use at industrial sites (Use in functional fluids)	22
Exposure scenario 7	Use at industrial sites (Use in water treatment)	24
Exposure scenario 8	Widespread use by professional workers (Use as a fuel)	26
Exposure scenario 9	Widespread use by professional workers – (Use in coatings)	28
Exposure scenario 10	Widespread use by professional workers (Use in lubricants) – High environmental release	30
Exposure scenario 11	Widespread use by professional workers (Use in water treatment)	32
Exposure scenario 12	Widespread use by professional workers (Use in functional fluids)	34
Exposure scenario 13	Widespread use by professional workers (Use in functional fluids)	36
Exposure scenario 14	Widespread use by professional workers (Use in explosive manufacturing and use)	38
Exposure scenario 15	Consumer use – Uses in coatings	40
Exposure scenario 16	Consumer use – Use as a fuel	46
Exposure scenario 17	Consumer use – Use in Functional	48
Exposure scenario 18	Consumer use – Use in lubricants	50

Contributing Scenarios

PROC Codes

PROC1 Use in closed process, no likelihood of exposure

PROC2 Use in closed, continuous process with occasional controlled exposure

PROC3 Use in closed batch process (synthesis or formulation)

PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises

PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7 Industrial spraying

PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

PROC10 Roller application or brushing PROC11 Non industrial spraying

PROC13 Treatment of articles by dipping and pouring

PROC15 Use as laboratory reagent

PROC16 Using material as fuel sources, limited exposure to unburned product to be expected

PROC17 Lubrication at high energy conditions and in partly open process

PROC18 Greasing at high energy conditions

PROC19 Hand-mixing with intimate contact and only PPE available

PROC20 Heat and pressure transfer fluids in dispersive, professional use but closed systems

PC Codes

PC1 Adhesives, sealants

PC4 Anti-Freeze and de-icing products

PC8 Biocidal products (e.g. Disinfectants, pest control)

PC9a Coatings and paints, thinners, paint removers

PC9b Fillers, putties, plasters, modelling clay

PC9c Finger paints

PC13 Fuels

PC15 Non-metal-surface treatment products

PC16 Heat transfer fluids

PC17 Hydraulic fluids

PC18 Ink and toners

PC23 Leather tanning, dye, finishing, impregnation and care products

PC24 Lubricants, greases, release products

PC31 Polishes and wax blends

PC34 Textile dyes, finishing and impregnating products; including bleaches and other processing aids

PC31 Polishes and wax blends

PC35 Washing and cleaning products (including solvent based products)

SU Codes SU0 Other

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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SU8 Manufacture of bulk, large scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals

Exposure Scenario 1: Formulation or re-packing

1.0 Contributing Scenarios	
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC3 Use in closed batch process (synthesis or formulation) (Elevated temperature) PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent
Environmental release categories [ERC]	ERC2 Formulation of preparations – CS1 (Bitumen) CS2 (Fuel)

2.0 Operational conditions and risk manag	ement measures	
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension	
Concentration of substance in product	All PROC's	100
Human factors not influenced by risk man	agement	
Frequency and duration of use	-	
Exposure duration per day	All PROC's	8hr
Other operational conditions affecting wor	ker exposure	
Area of use	All PROC's	Indoor
Operating temperature	All PROC's	<= 40 °C
Vapour pressure	All PROC's	288.8 Pa
Drain down systems and clear transfer lines p Where there is potential for exposure: Ensure exposures; Ensure suitable personal protectiv requirements; monitor effectiveness of control General measures (skin irritants) Avoid contact with skin and eyes. Avoid inhala Organisational measures	a systems, propeny designed and maintained facinity rior to breaking containment. Drain down and flush e relevant staff are informed of the nature of exposure e equipment is available; Clear up spills and dispose measures; consider the need for health surveillance ation of vapours.	equipment where possible prior to maintenance. e and aware of basic actions to minimise e of waste in accordance with regulatory e; identify and implement corrective actions.
All PROC's	controls assumed	agement System: Advanced (Industrial) exposure
Technical conditions of use	1	
PROC1	Use in closed process, no likelihood of exposure. Occupational Health and Safety Management Sys Basic general ventilation (1-3 air changes per hou	Local exhaust ventilation – Not required. .tem: Advanced r)
PROC2, PROC3	Use in closed, continuous process with occasiona Not required. Occupational Health and Safety Mar Basic general ventilation (1-3 air changes per hou	I controlled exposure. Local exhaust ventilation – nagement System: Advanced r)
PROC5, PROC8a, PROC8b, PROC9, PROC15	Local exhaust ventilation – Not required. Occupati Advanced Basic general ventilation (1-3 air changes per hou	onal Health and Safety Management System: r)
Risk management measures related to hur	nan health	
Respiratory protection	Not required	
Hand and/or Skin protoction	Not required	
	Not required	
Eye Protection	Not required	
2.2 Control of environmental exposure		

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Amounts used	
Fraction of EU tonnage used in region:	100 % (CS2)
Regional use tonnage (tons/year):	1.5E6
Annual site tonnage (tons/year):	<= 3E4
Maximum daily site tonnage (kg/day):	<= 10 000
Operational conditions	
Emission days (days/year):	300
Release fraction to air from process (initial release prior to	0.5% (CS1)
RMM):	0.5 (CS2)
Release fraction to wastewater from process (initial release prior	5E-4% (CS1)
to RMM):	5E-4% (CS2)
Local release rate (Air) (kg/day)	50 (CS1)
Local release rate (Water) (kg/day)	0.05 (CS1)
Technical onsite conditions and measures to reduce or limit of	lischarges, air emissions and releases to soil
Typical measures to maintain workplace concentrations of airborne	e VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas
removal and/or air filtration, particle removal and/or thermal oxidati	ion and/or vapour recovery, adsorption. Upgrade of the system in place or
additional air treatment measures, such as wet scrubber and/or air	filtration and/or thermal oxidation and/or vapour recovery systems, in order to
achieve a reduction of the air emissions.	
Equipment cleaning and maintenance: Not applicable as there is n	o release to wastewater.
Treat air emission to provide a typical removal efficiency of (%):	50% (CS2)
Treat onsite wastewater (prior to receiving water discharge) to	70% (CS2)
provide the required removal efficiency of (%):	70% (CS2)
Organisational measures to prevent/limit release from site	
Process optimized for efficient use of raw materials.	
Conditions and measures related to municipal sewage treatm	ent plant
Discharge rate of STP	>= 2E3 m3/day (CS2)
Degradation effectiveness (%)	94.63% (CS2)
Substance release quantities after risk management measure	S
Poloase factor after on site PMM (Air)	0.5% (CS1)
Release factor after on-site Rivivi (All)	0.25% (CS2)
Release factor after on site RMM (Water)	5E-4% (CS1)
אפובמשב ומכוטו מונכו טווישונ ואווווו (אימוכו)	1.5E-4% (CS2)
Release factor after on-site RMM (soil)	0.01% (CS1) (CS2)

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

	In	halation	Derma	al	Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC5	45.41	0.309	13.71	0.326	0.635
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC9	45.41	0.309	6.86	0.163	0.472
PROC15	45.41	0.309	0.34	< 0.01	0.317

ECETOC TRA

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model) PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	1.7E-03	7.3E-05	3.2E-03	5.7E-01	5.7E-02
Risk Characterization Ratio (RCR)	6.4E-01	3.0E-02	3.2E-03	3.3E-01	3.3E-02

Indirect exposure to humans via the environment:						
	Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)			

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Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Oral	6.8E-05	2.3E-04
Inhalation	7.1E-06	2.2E-03
Combined routes	7.5E-05	2.4E-03

For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are		
0	managed to at least equivalent levels.		
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Exposure Scenario 2: Use at industrial sites (Use as Intermediate by Industry)

1.0 Contributing Scenarios	
Sector of uses SU	SU8 Manufacture of bulk, large scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC15 Use as laboratory reagent
Environmental release categories [ERC]	ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

2.0 Operational conditions and risk management measures						
2.1 Control of worker exposure	2.1 Control of worker exposure					
Product characteristics						
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension					
Concentration of substance in product	All PROC's	100				
Human factors not influenced by risk management						
Frequency and duration of use						
Exposure duration per day	All PROC's	8hr				
Other operational conditions affecting worker exposure						
Area of use	All PROC's	Indoor				
Operating temperature	All PROC's	<= 40 °C				
Vapour pressure	All PROC's	288.8 Pa				
	14					

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Avoid inhalation of vapours.

Organisational measures			
	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure		
AII 1 100 3	controls assumed		
Technical conditions of use			
	Use in closed process, no likelihood of exposure. Local exhaust ventilation – Not required.		
PROC1	Occupational Heal	Ith and Safety Management System: Advanced	
	Basic general vent	tilation (1-3 air changes per hour)	
	Use in closed, con	tinuous process with occasional controlled exposure. Local exhaust ventilation –	
PROC2, PROC3	Not required. Occupational Health and Safety Management System: Advanced		
	Basic general vent	tilation (1-3 air changes per hour)	
	Local exhaust ventilation – Not required. Occupational Health and Safety Management System:		
PROC8a, PROC8b, PROC15	Advanced		
	Basic general vent	entilation (1-3 air changes per hour)	
Risk management measures related to human health			
Respiratory protection	Not required		
Hand and/or Skin protoction	Not required		
	Not required		
Eye Protection	Not required		
2.2 Control of environmental exposure			
Amounts used			
Annual site tonnage (tons/year):		1.5E4	
Maximum daily site tonnage (kg/day):		<= 50 000	
Operational conditions			
Emission days (days/year):		300	
Release fraction to air from process (initial release prior to RMM):		0.01%	

Renewable hydrocarbons

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Delegas fraction to wastewater from process (initial release prior				
Release fraction to wastewater from process (initial release prior	1F-3%			
to RMM):				
Local release rate (Air) (kg/day)	2.5			
Local release rate (Water) (kg/day)	0.15			
Technical onsite conditions and measures to reduce or limit of	discharges, air emissions and releases to soil			
Typical measures to maintain workplace concentrations of airborn	e VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas			
removal and/or air filtration, particle removal and/or thermal oxidat	ion and/or vapour recovery, adsorption. Upgrade of the system in place or			
additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to				
achieve a reduction of the air emissions.				
Equipment cleaning and maintenance: Not applicable as there is no release to wastewater.				
reat air emission to provide a typical removal efficiency of (%): 50%				
Treat onsite wastewater (prior to receiving water discharge) to	70%			
provide the required removal efficiency of (%):	7078			
Organisational measures to prevent/limit release from site				
Process optimized for efficient use of raw materials.				
Substance release quantities after risk management measures				
Release factor after on-site RMM (Air)	5E-3%			
Release factor after on-site RMM (Water)	3E-4%			
Release factor after on-site RMM (soil)	0.1%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC15	45.41	0.309	0.34	< 0.01	0.317

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	1.7E-03	7.3E-05	7.0E-04	5.7E-01	5.7E-02
Risk Characterization Ratio (RCR)	6.4E-01	3.0E-02	2.9E-04	3.3E-01	3.3E-02

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	1.2E-04
Inhalation	7.1E-06	2.3E-05
Combined routes	7.5E-05	1.4E-04

4. Evaluation guidance to downstream user			
For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.		
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Exposure Scenario 3: Use at industrial sites (Use as a fuel)

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC15 Use as laboratory reagent PROC16 Using material as fuel sources, limited exposure to unburned product to be expected
Environmental release categories [ERC]	FRC7 Industrial use of substances in closed systems

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension				
Concentration of substance in product	All PROC's	100			
Human factors not influenced by risk man	agement				
Frequency and duration of use					
Exposure duration per day	All PROC's	8hr			
Other operational conditions affecting worker exposure					
Area of use All PROC's Indoor					
Operating temperature All PROC's <= 40 °C					
Vapour pressure	apour pressure All PROC's 288.8 Pa				

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Ávoid inhalation of vapours.

Organisational measures			
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed		
Technical conditions of use			
PROC1	Use in closed process, no likelihood of exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
PROC2	Use in closed, conti Not required. Occup Basic general ventil	nuous process with occasional controlled exposure. Local exhaust ventilation – bational Health and Safety Management System: Advanced ation (1-3 air changes per hour	
PROC3	Use in contained batch processes. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
PROC1(General exposures (closed systems), PROC2(General exposures (closed systems)), PROC3(General exposures (closed systems)), PROC8a, PROC8b, PROC15, PROC16	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
Risk management measures related to hun	nan health		
Respiratory protection	Not required		
Hand and/or Skin protection	Not required		
Eye Protection	Not required		
2.2 Control of environmental exposure			
Amounts used			
Annual site tonnage (tons/year):		<= 1E4	
Maximum daily site tonnage (kg/day):		<= 33 330	
Operational conditions			

Renewable hydrocarbons

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Emission days (days/year):	300			
Release fraction to air from process (initial release prior to	0.6%			
RMM):				
Local release rate (Air) (kg/day)	199.9			
Local release rate (Water) (kg/day)	0.02			
Technical onsite conditions and measures to reduce or limit of	discharges, air emissions and releases to soil			
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas				
removal and/or air filtration, particle removal and/or thermal oxidat	ion and/or vapour recovery, adsorption. Upgrade of the system in place or			
additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to				
achieve a reduction of the air emissions.				
Equipment cleaning and maintenance: Not applicable as there is no release to wastewater.				
Substance release quantities after risk management measures				
Release factor after on-site RMM (Air)	0.6%			
Release factor after on-site RMM (Water)	6E-5%			
Release factor after on-site RMM (soil)	0%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA

	In	halation	Derma	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC15	45.41	0.309	0.34	< 0.01	0.317
PROC16	9.083	0.062	0.34	<0.01	0.07

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.5E-04	2.9E-06	1.3E-03	1.6E-01	2.3E-03
Risk Characterization Ratio (RCR)	3.6E-01	1.2E-03	1.3E-03	1.1E-01	1.3E-03

Indirect exposure to humans via the environment:

Exposure estimation (ug/kg/dav)	Risk characterisation ratio (RCR)
6.8E-05	8.7E-04
7.1E-06	7.5E-05
7.5E-05	9.5E-04
	Exposure estimation (µg/kg/day) 6.8E-05 7.1E-06 7.5E-05

4. Evaluation guidance to downstream user				
For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are			
Exposure assessment	Workers	TRA Workers 3.0		
instrument/tool/method	Environmental exposure	PETRORISK v7.04		

Exposure Scenario 4: Use at industrial sites (Use in coatings)

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Hartree

Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7 Industrial spraying PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring PROC15 Use as laboratory reagent
Environmental release categories [ERC]	ERC7 Industrial use of substances in closed systems

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension				
Concentration of substance in product	All PROC's	100			
Human factors not influenced by risk mana	agement				
Frequency and duration of use					
Exposure duration per day	All PROC's	8hr			
Other operational conditions affecting worker exposure					
Area of use All PROC's Indoor					
Operating temperature All PROC's <= 40 °C					
Vapour pressure	All PROC's	288.8 Pa			

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Avoid inhalation of vapours.

Organisational measures					
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed				
Technical conditions of use					
PROC1, PROC2, PROC4, PROC5,	Local exhaust ven	tilation - Not required. Occupati	onal Health and Safety Management System:		
PROC8a, PROC8b, PROC10, PROC13,	Advanced				
PROC15	Basic general ven	tilation (1-3 air changes per hou	r)		
	Local exhaust ven	tilation – Not required. Occupati	onal Health and Safety Management System:		
PROC7	Advanced.				
	Provide a good sta	andard of general ventilation (no	t less than 3 to 5 air changes per hour).		
Risk management measures related to hu	man health		•		
	PROC1, PROC2,	PROC4, PROC5, PROC8a,	Not required		
Respiratory protection	PROC8b, PROC1	0, PROC13, PROC15	Notrequired		
	PROC7		Yes (APF >= 10)		
	PROC1, PROC2, PROC4, PROC5, PROC8a,		Not required		
	PROC8b, PROC1	3, PROC15			
Hand and/or Skin protection		_	Wear chemically resistant gloves (tested to		
	PROC 7, PROC10)	EN374) in combination with specific activity		
			training. Dermal treatment effectiveness: 80%		
Eye Protection	Not required				
2.2 Control of environmental exposure					
Amounts used					
Annual site tonnage (tons/year):		<= 5E3			
Maximum daily site tonnage (kg/day):		<= 18 500			
Operational conditions					
Emission days (days/year):	Emission days (days/year):				
Release fraction to air from process (initial release prior to RMM):		98%			

Renewable hydrocarbons

Hartree®

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Release fraction to wa	astewater from process (initial release prior		e prior 2E-3%	2E-3%			
to RIVINI):) (ka/day)	(40)()		1 81F4 kg/day			
	rate (Mater) (kg/day)		0.37 kg/	0.37 kg/day			
Technical onsite con	r limit discharge	discharges air emissions and releases to soil					
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas							
additional air treatmen	removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery, adsorption.						
achieve a reduction of	the air emissions				uation and/or vapour	recovery systems, in order to	
Equipment cleaning ar	nd maintenance: N	ot applicable as th	nere is no release	to wastewater.			
Organisational meas	ures to prevent/li	nit release from	site				
Process optimized for	efficient use of raw	materials.					
Substance release q	uantities after risk	management m	easures				
Release factor before	on-site RMM (Air)		0.98%				
Release factor after or	n-site RMM (Air)		0.98%				
Release factor before	on-site RMM (Wate	er)	2E-3%				
Release factor after or	n-site RMM (Water)	2E-3%				
Release factor after or	n-site RMM (soil)		0%				
3. Exposure estimation	on and reference	to its source					
3.1 Human exposure	prediction						
Exposure assessment	(method/calculatio	n model)	ECETO	C TRA			
		Inhalation		Dermal	-	Combined	
Process categor	y inhalation exposure	Risk characteris	ation expo	dermal sure(mg/kg	Risk characterisatio	Risk characterisation ratio	
	(ma/m ³)	ratio (RC	(R)	bw/dav)	n ratio (RCR)		
	(,	, ,			
PROC1	0.091	< 0.01		0.034	<0.01	<0.01	
PROC1 PROC2	0.091 9.083	<0.01 0.062		0.034 1.37	<0.01 0.033	<0.01 0.094	
PROC1 PROC2 PROC4	0.091 9.083 45.41	<0.01 0.062 0.309		0.034 1.37 6.86	<0.01 0.033 0.163	<0.01 0.094 0.472	
PROC1 PROC2 PROC4 PROC7	0.091 9.083 45.41 63.58	<pre> <0.01</pre>		0.034 1.37 6.86 8.572	<0.01 0.033 0.163 0.204	<0.01 0.094 0.472 0.637	
PROC1 PROC2 PROC4 PROC7 PROC8a	0.091 9.083 45.41 63.58 90.83	 <0.01 0.062 0.309 0.433 0.618 		0.034 1.37 6.86 8.572 13.71 10.71	<pre><0.01 0.033 0.163 0.204 0.326 0.202</pre>	<0.01 0.094 0.472 0.637 0.944	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b	0.091 9.083 45.41 63.58 90.83 45.41	<0.01 0.062 0.309 0.433 0.618 0.309		0.034 1.37 6.86 8.572 13.71 13.71 13.71	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.421</pre>	<0.01 0.094 0.472 0.637 0.944 0.635	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC12	0.091 9.083 45.41 63.58 90.83 45.41 90.83 00.83	<pre></pre> <0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.309		0.034 1.37 6.86 8.572 13.71 13.71 5.486 12.71	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.206</pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC15	0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 90.83	<pre></pre> <0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.618 0.618 0.618		0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.24	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.326 </pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.944	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13	0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 90.83 45.41	 <0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.618 0.618 0.618 0.309 		0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.326 < 0.01</pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15	0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 90.83 45.41	 <0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.618 0.618 0.309 		0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.326 < 0.01</pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15	0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 90.83 45.41 (posure prediction (method/calculation)	 <0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.618 0.618 0.309 	PETRO	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34 RISK v7.04	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.326 < 0.01</pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment	(<0.01 0.062 0.309 0.433 0.618 0.309 0.618 0.618 0.618 0.309 n model) 	PETROF	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34 RISK v7.04	<pre><0.01 0.033 0.163 0.204 0.326 0.326 0.131 0.326 <<0.01</pre>	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment	(<pre></pre>	PETROF	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34 RISK v7.04	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15 3.2 Environmental exposure assessment Exposure assessment Predicted Exposure (f	(<pre></pre>	PETROF marine water 4.9E-05	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment environme Predicted Exposure (f Risk Charan	(<0.01	PETROF marine water 4.9E-05 2.0E-02	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment environme Predicted Exposure (f Risk Charac	(<pre></pre>	PETROF marine water 4.9E-05 2.0E-02	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment environme Predicted Exposure (f Risk Charae	(g)m 0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 45.41 90.83 45.41 90.83 90.83 45.41 90.83 90.83 90.83 90.83 45.41 cmethod/calculatic 90.83 ental exposure Environmental PEC) (Regional) cterization Ratio RCR) umans via the environmental	<pre></pre>	PETROF marine water 4.9E-05 2.0E-02	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment Predicted Exposure (f Risk Charaa (t)	(g)m 0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 cmethod/calculation 6000000000000000000000000000000000000	<0.01	PETROF marine water 4.9E-05 2.0E-02	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34 RISK v7.04 soil 1.1E-01 1.1E-01 Risk cha	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02 RCR)	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment Predicted Exposure (f Risk Charae (t)	(g)m 0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 90.83 20.83 90.83 45.41 cmethod/calculatic 90.83 ental exposure Environmental PEC) (Regional) cterization Ratio RCR) mans via the enviro Oral Oral	<0.01	PETROF marine water 4.9E-05 2.0E-02	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02 RCR)	
PROC1 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment Predicted Exposure (f Risk Charau (f)	(g)m 0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 cmethod/calculatic 63.58 90.83 45.41 cmethod/calculatic 63.58 ental exposure Environmental PEC) (Regional) cterization Ratio RCR) mans via the enviro Oral Inhalation	<0.01	PETROF marine water 4.9E-05 2.0E-02 ure estimation g/kg/day) 6.8E-05 7.1E-06	0.034 1.37 6.86 8.572 13.71 13.71 13.71 13.71 0.34 13.71 5.486 13.71 0.34 RISK v7.04 soil 1.1E-01 1.1E-01 Risk cha	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02 RCR)	
PROC1 PROC2 PROC2 PROC4 PROC7 PROC8a PROC8b PROC10 PROC13 PROC13 PROC13 PROC15 3.2 Environmental ex Exposure assessment Predicted Exposure (f Risk Charau (f)	(g)m 0.091 9.083 45.41 63.58 90.83 45.41 90.83 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 90.83 45.41 cmethod/calculatic 63.58 90.83 45.41 90.83 45.41 cmethod/calculatic 63.58 ental exposure Environmental PEC) (Regional) Cterization Ratio RCR) mans via the enviro Oral Inhalation Combined rout Combined rout	<0.01	PETROF marine water 4.9E-05 2.0E-02 ure estimation g/kg/day) 6.8E-05 7.1E-06 7.5E-05	0.034 1.37 6.86 8.572 13.71 13.71 5.486 13.71 0.34 RISK v7.04 soil 1.1E-01 1.1E-01 Risk cha	<0.01	<0.01 0.094 0.472 0.637 0.944 0.635 0.749 0.944 0.317 marine sediment 3.8E-02 2.2E-02 RCR)	

4. Evaluation guidance to downstream user

For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are				
	managed to at least equivalent levels.				
Exposure assessment	Workers	TRA Workers 3.0			
instrument/tool/method	Environmental exposure	PETRORISK v7.04			

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

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Date of issue: 20th December 2023 Version: 1.0

Exposure Scenario 5: Use at industrial sites (Use in lubricants)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC7 Industrial spraying PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring PROC17 Lubrication at high energy conditions and in partly open process PROC18 Greasing at high energy conditions
Environmental release categories [ERC]	ERC7 Industrial use of substances in closed systems

2.0 Operational conditions and risk management measures			
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension		
Concentration of substance in product	All PROC's	100%	
Human factors not influenced by risk man	agement		
Frequency and duration of use			
Exposure duration per day	All PROC's	8hr	
Other operational conditions affecting wo	rker exposure		
Area of use	All PROC's	Indoor	
Operating temperature	All PROC's	<= 40 °C	
Vapour pressure	All PROC's	288.8 Pa	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented, maximum process temperature; 40°C. Control any potential exposure			
using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise			

exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Ávoid inhalation of vapours.

Organisational measures				
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed			
Technical conditions of use				
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10,	Local exhaust ventilation – Not required. Occupati Advanced	ional Health and Safety Management System:		
PROC13,	Basic general ventilation (1-3 air changes per hou	r)		
PROC7, PROC17	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).			
PROC18	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced. Enhanced general ventilation (5-10 air changes per hour)			
Risk management measures related to hu	man health			
Respiratory protection	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC18	Not required		
	PROC7	Yes (APF ≥ 10)		

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Date of issue: 20th December 2023 Version: 1.0

	PROC1, PROC2, PROC13, PROC1	PROC4, PROC8a, PROC8b, 8	Not required	
Hand and/or Skin protection	and/or Skin protection PROC 7, PROC10, PR		Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal treatment effectiveness: 80%	
Eye Protection	Not required			
2.2 Control of environmental exposure				
Amounts used				
Regional use tonnage (tons/year):		<= 1E4		
Annual site tonnage (tons/year):		<= 2E4		
Maximum daily site tonnage (kg/day):		<= 33 330		
Operational conditions				
Emission days (days/year):		300		
Release fraction to air from process (initial release RMM):	ease prior to	0.1%	0.1%	
Release fraction to wastewater from process (to RMM):	initial release prior	1E-4%		
Local release rate (Air) (kg/day)		33.33 kg/day		
Local release rate (Water) (kg/day)		0.033 kg/day		
Technical onsite conditions and measures	to reduce or limit of	discharges, air emissions and	I releases to soil	
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to achieve a reduction of the air emissions.			respective OELs: e.g. thermal wet scrubber, gas corption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Equipment cleaning and maintenance: Not ap	plicable as there is r	no release to wastewater.		
Organisational measures to prevent/limit re	elease from site			
Process optimized for efficient use of raw mat	erials.			
Substance release quantities after risk management measures				
Release factor before on-site RMM (Air)		0.1%		
Release factor after on-site RMM (Air)		0.1%		
Release factor before on-site RMM (Water)		1E-4%		
Release factor after on-site RMM (Water)		1E-4%		
Release factor after on-site RMM (soil)		0.1%		

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

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	In	halation	Derma		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC4	45.41	0.309	6.86	0.163	0.472
PROC7	63.58	0.433	8.572	0.204	0.637
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC9	45.41	0.309	6.86	0.163	0.472
PROC10	90.83	0.618	5.486	0.131	0.749
PROC13	90.83	0.618	13.71	0.326	0.944
PROC17	127.1	0.865	5.486	0.131	0.996
PROC18	54.5	0.371	13.71	0.326	0.697

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model) PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.7E-04	4.9E-06	8.8E-04	1.8E-01	3.8E-03
Risk Characterization Ratio (RCR)	3.6E-01	2.0E-03	4.8E-04	1.2E-01	2.2E-03

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Indirect exposure to humans via the environment:				
	Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)	
	Oral	6.8E-05	8.3E-05	
	Inhalation	7.1E-06	1.5E-04	
	Combined routes	7.5E-05	2.3E-04	

4. Evaluation guidance to downstream user			
For scaling see	Where other risk management me managed to at least equivalent lev	asures/operational conditions are adopted, then users should ensure that risks are els.	
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Exposure Scenario 6: Use at industrial sites (Use in functional fluids)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental release categories [ERC]	ERC7 Industrial use of substances in closed systems

2.0 Operational conditions and risk management measures				
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension			
Concentration of substance in product	All PROC's	100%		
Human factors not influenced by risk mana	gement			
Frequency and duration of use				
Exposure duration per day	All PROC's	8hr		
Other operational conditions affecting work	ker exposure			
Area of use	All PROC's	Indoor		
Operating temperature	All PROC's	<= 40 °C		
Vapour pressure	All PROC's	288.8 Pa		
General measures applicable to all activitie	s			
Assumes a good basic standard of occupation	al hygiene is implemented. maximum process tempe	erature: 40°C. Control any potential exposure		
using measures such as contained or enclosed	d systems, properly designed and maintained facilitie	es and a good standard of general ventilation.		
Drain down systems and clear transfer lines pr	ior to breaking containment. Drain down and flush e	quipment where possible prior to maintenance.		
Where there is potential for exposure: Ensure	relevant staff are informed of the nature of exposure	and aware of basic actions to minimise		
exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory				
requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.				
General measures (skin irritants)				
Avoid contact with skin and eyes. Avoid innaiation of vapours.				
Organisational massures				

All PROC's Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed
Technical conditions of use

Renewable hydrocarbons

Date of issue: 20th December 2023 Version: 1.0

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PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
Risk management measures related to hun	nan health	·	
Respiratory protection	All PROC's		Not required
Hand and/or Skin protection	All PROC's		Not required
Eye Protection	Not required		
2.2 Control of environmental exposure			
Amounts used			
Regional use tonnage (tons/year):		<= 10	
Annual site tonnage (tons/year):		<= 2E4	
Maximum daily site tonnage (kg/day):		<= 500	
Operational conditions			
Emission days (days/year):		2.0E+01	
Release fraction to air from process (initial release prior to RMM):		0.1%	
Release fraction to wastewater from process (initial release prior to RMM):		1E-4%	
Local release rate (Air) (kg/day)		0.5 kg/day	
Local release rate (Water) (kg/day)		5E-4 kg/day	
Technical onsite conditions and measures	to reduce or limit of	discharges, air emissions and	releases to soil
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to achieve a reduction of the air emissions			
Equipment cleaning and maintenance: Not ap	plicable as there is r	no release to wastewater.	
Organisational measures to prevent/limit re	elease from site		
Process optimized for efficient use of raw mate	erials.		
Substance release quantities after risk mar	nagement measure	es	
Release factor before on-site RMM (Air)	on-site RMM (Air) 0.1%		
Release factor after on-site RMM (Air)		0.1%	
Release factor before on-site RMM (Water)		1E-4%	
Release factor after on-site RMM (Water)		1E-4%	
Release factor after on-site RMM (soil) 0.1%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

	Inhalation		Derma	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC4	45.41	0.309	6.86	0.163	0.472
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC9	45.41	0.309	6.86	0.163	0.472

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3.2 Environmental exposure prediction

Exposure assessment (method/calculation model) PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.3E-04	2.4E-06	2.2E-07	1.4E-01	4.3E-04
Risk Characterization Ratio (RCR)	3.5E-01	1.0E-03	2.6E-04	9.8E-02	1.5E-04

Indirect exposure to humans via the environment:					
	Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)		

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Oral	6.8E-05	6.8E-05
Inhalation	7.1E-06	7.2E-06
Combined routes	7.5E-05	7.5E-05

4. Evaluation guidance to de	ownstream user			
For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.			
Exposure assessment	Workers	TRA Workers 3.0		
instrument/tool/method	Environmental exposure	PETRORISK v7.04		

Exposure Scenario 7: Use at industrial sites (Use in water treatment)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13 Treatment of articles by dipping and pouring
Environmental release categories [ERC]	ERC4 Industrial use of processing aids in processes and products, not becoming part of articles

2.0 Operational conditions and risk management measures

2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension	
Concentration of substance in product	All PROC's	100%
Human factors not influenced by risk man	agement	
Frequency and duration of use		
Exposure duration per day	All PROC's	8hr
Other operational conditions affecting wo	rker exposure	
Area of use	All PROC's	Indoor
Operating temperature	All PROC's	<= 40 °C
Vapour pressure	All PROC's	288.8 Pa

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Avoid inhalation of vapours.

Organisational measures				
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed			
Technical conditions of use				
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)			
Risk management measures related to hun	nan health			
Respiratory protection	All PROC's	Not required		
Hand and/or Skin protection	All PROC's	Not required		

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Eve Protection		Not required				
2.2 Control of environmen	Notrequired					
Amounts used	lai exposure					
Regional use tonnage (tons)	(vear).		<= 1 12			
Appual site toppage (tops/ve	year).		<- 1.12 <- 2E4			
Maximum daily site tonnage	(ka/dav):		<= 3.7			
Operational conditions	(kg/ddy).		- 5.1			
Emission days (days/year)			3 0E+02			
Release fraction to air from	nrocess (initial r	elease prior to	0.02 02			
RMM).			0.03%			
Release fraction to wastewa to RMM):	ter from process	s (initial release prior	40%			
Local release rate (Air) (kg/c	lay)		1.11E-3 kg/day			
Local release rate (Water) (I	(g/day)		1.48 kg/day			
Technical onsite condition	ns and measure	es to reduce or limit o	lischarges, air emissions a	and releases to soil	1	
Typical measures to maintai removal and/or air filtration, additional air treatment mea achieve a reduction of the ai Equipment cleaning and ma Organisational measures Process optimized for efficie Substance release quantit Release factor before on-site Release factor after on-site	n workplace cor particle removal sures, such as v in emissions. intenance: Not a to prevent/limit ent use of raw ma ies after risk m e RMM (Air) RMM (Air) e RMM (Mator)	acentrations of airborn and/or thermal oxidat vet scrubber and/or air applicable as there is r release from site aterials. anagement measure	e VOCs and particulates belo ion and/or vapour recovery, i r filtration and/or thermal oxid no release to wastewater. s 0.03% 0.03%	ow respective OELs: adsorption. Upgrade dation and/or vapour	e e.g. thermal wet scrubber, gas of the system in place or recovery systems, in order to	
Release factor after on-site	RMM (Water)		40%			
Release factor after on-site	RMM (soil)		0%			
3. Exposure estimation and reference to its source 3.1 Human exposure prediction Exposure assessment (method/calculation model)						
	In	halation	Dermal		Combined	
Process category IPROC1	inhalation exposure	Risk characterisation	dermal exposure(mg/kg	Risk characterisatio	Risk characterisation ratio (RCR)	

[PROC]	exposure (mg/m³)	characterisation ratio (RCR)	exposure(mg/kg bw/day)	n ratio (RCR)	(RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	9.083	0.062	1.37	0.033	0.094
PROC3	27.25	0.185	0.69	0.016	0.202
PROC4	45.41	0.309	6.86	0.163	0.472
PROC8a	90.83	0.618	13.71	0.326	0.944
PROC8b	45.41	0.309	13.71	0.326	0.635
PROC13	90.83	0.618	13.71	0.326	0.944

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model) PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	2.2E-03	2.2E-04	1.3E-06	1.6E+00	1.7E-01
Risk Characterization Ratio (RCR)	8.8E-01	8.8E-02	2.6E-04	1.0E+00	1.0E-01

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	1.4E-04
Inhalation	7.1E-06	9.9E-06
Combined routes	7.5E-05	1.5E-04

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

4. Evaluation guidance to downstream user				
For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.			
Exposure assessment	Workers	TRA Workers 3.0		
instrument/tool/method	Environmental exposure	PETRORISK v7.04		

Exposure Scenario 8: Widespread use by professional workers (Use as a fuel)

1.0 Contributing Scenarios				
Sector of uses SU	SU0 Other			
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC16 Using material as fuel sources, limited exposure to unburned product to be expected			
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems – CS1-Use as a fuel ERC9b Wide dispersive outdoor use of substances in closed systems – CS2-Use as a fuel			

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension				
Concentration of substance in product	All PROC's	100%			
Human factors not influenced by risk mana	agement				
Frequency and duration of use					
Exposure duration per day	All PROC's	8hr			
Other operational conditions affecting worker exposure					
Area of use	All PROC's	Indoor			
Operating temperature	All PROC's	<= 40 °C			
Vapour pressure	All PROC's	288.8 Pa			

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Avoid inhalation of vapours.

Organisational measures			
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed		
Technical conditions of use			
PROC1	Use in closed process, no likelihood of exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)		
PROC2	Use in closed, continuous process with occasional controlled exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)		
PROC8b, PROC16	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
PROC8a	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Enhanced general ventilation (5-10 air changes per hour)		
Risk management measures related to hur	nan health		

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Date of issue: 20th December 2023 Version: 1.0

						1		1
Respirat	ory protection		All PROC's	3	Not required			
Hand an	d/or Skin protection	ection All PROC's				Not required		
Eye Protection Not required				d				
2.2 Control of environmental exposure								
Amounts used				<= 2E5				
Annual site tonnage (tons/year).				<= 3E3				
Maximum daily site tonnage (kg/day):				<= 41				
Emission				2 7E+02				
Emission days (days/year).			3.7 E+02					
Release fraction to air from process (initial release prior to RMM):			0.5%	0.5%				
Release fraction to wastewater from process (initial release prior to RMM):			1E-4%	1E-4%				
Local rel	ease rate (Water) (kg/day)		4.11E-5	kg/day			
Technic	al onsite condition	ns and measu	ires to reduce o	r limit discharge	s, air emissions a	and releases to soil		
Typical r removal additiona achieve	neasures to mainta and/or air filtration, al air treatment mea a reduction of the a	in workplace of particle removisures, such as ir emissions.	concentrations of al and/or therma s wet scrubber ar	airborne VOCs ar I oxidation and/or nd/or air filtration a	nd particulates belovery, a and/or thermal oxid	ow respective OELs: adsorption. Upgrade dation and/or vapour	e.g. thermal wet scrubber, of the system in place or recovery systems, in order	gas to
Equipme	ent cleaning and ma		t applicable as tr		to wastewater.			
Organis	ational measures	to prevent/lin	motorials	SITE				
Process	optimized for efficie	ent use of raw	materials.					
Substar	ice release quanti	ties after risk	management m	easures				
Release	factor before on-sit			0.5%				
Release	factor after on-site	RMM (Air)	``	0.5%				
Release	factor before on-sit	e RMM (Wate	r)	1E-4%				
Release	factor after on-site	RMM (Water)		1E-4%				
Release	factor after on-site	RMM (soil)		0.025%	0.025%			
3. Expos	sure estimation an	d reference t	o its source					
			0 110 000100					
2.4.11.000								
3.1 Hum	an exposure pred	iction						
3.1 Hum Exposure	an exposure pred e assessment (met	iction nod/calculation	n model)	ECETO	CTRA			
3.1 Hum Exposure	nan exposure pred e assessment (met	iction nod/calculation	n model)	ECETO	C TRA		Combined	
3.1 Hum Exposure	an exposure pred e assessment (met	iction nod/calculation inhalation	n model)	ECETO	C TRA Dermal	Risk	Combined	
3.1 Hum Exposure Pro	e assessment (met	iction nod/calculation inhalation exposure	n model) Inhalation Risk characteris	ECETO	C TRA Dermal dermal osure(mg/kg	Risk characterisatio	Combined Risk characterisation r	atio
3.1 Hum Exposure Pro	an exposure pred e assessment (met cess category [PROC]	iction nod/calculation inhalation exposure (mg/m³)	n model) Inhalation Risk characteris ratio (RC	ation expo R)	C TRA Dermal dermal osure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Combined Risk characterisation r (RCR)	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1	iction nod/calculation inhalation exposure (mg/m³) 0.091	n model) Inhalation Characteris ratio (RC <0.01	ation expo R)	C TRA Dermal dermal osure(mg/kg bw/day) 0.034	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1 PROC2	iction nod/calculation inhalation exposure (mg/m³) 0.091 45.41	n model) Inhalation Characteris ratio (RC <0.01 0.309	ation expo R)	C TRA Dermal seure(mg/kg bw/day) 0.034 1.37	Risk characterisatio n ratio (RCR) <0.01 0.033	Combined Risk characterisation r (RCR) <0.01 0.342	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1 PROC2 PROC8a	iction nod/calculation inhalation exposure (mg/m³) 0.091 45.41 68.12	n model) Inhalation Characteris ratio (RC <0.01 0.309 0.463	ation expo R)	C TRA Dermal ssure(mg/kg bw/day) 0.034 1.37 13.71	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326	Combined Risk characterisation r (RCR) <0.01 0.342 0.79	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b	iction inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83	n model) Inhalation Characteris ratio (RC <0.01 0.309 0.463 0.618	ation expo	Dermal bermal sure(mg/kg bw/day) 0.034 1.37 13.71 13.71	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16	iction inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083	n model) Inhalation Characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ation expo	Dermal dermal soure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro	e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16	iction inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083	n model) Inhalation Characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ECETO(ation expo R)	Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi	e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16	iction nod/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 9.083	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ation expo	Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	e assessment (met e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 PROC16 ronmental exposu e assessment (met	iction nod/calculation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 9.083 re prediction nod/calculation	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ECETOO ation expo R)	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34 RISK v7.04	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 PROC16 ronmental exposu e assessment (met	iction nod/calculation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ECETO ation expo R)	C TRA Dermal dermal sure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34 RISK v7.04	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met	iction nod/calculation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062	ECETO(C TRA Dermal dermal sure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34 RISK v7.04	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental	iction nod/calculation inhalation exposure (mg/m³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater	ECETOO ation expo R) PETROF	C TRA Dermal dermal psure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 soil	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01 <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ironmental exposu e assessment (met environmental Predicted Envir	iction nod/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Pagional)	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04	ECETOO ation expo R) PETROF marine water 2.3E-06	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 soil 3.6E-06	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 marine sediment 3.8E-04	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Disk Characteriza	iction ind/calculation exposure (mg/m³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional)	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04	ECETOO ation expo R) PETROF marine water 2.3E-06	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 Soil 3.6E-06	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01 0.326 0.326 0.326 1.326 1.4E-01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 marine sediment 3.8E-04	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characteriza (RCR)	iction ind/calculation inhalation exposure (mg/m³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01	ECETOO ation expo R)	Dermal dermal osure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 soil 3.6E-06 2.7E-04	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01 <0.01 freshwater sediment 1.4E-01 9.8E-02	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characteriz: (RCR)	iction nod/calculation inhalation exposure (mg/m³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01 onment:	ECETOO ation expo R) PETROF marine water 2.3E-06 9.8E-04	Dermal dermal osure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 soil 3.6E-06 2.7E-04	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 marine sediment 3.8E-04 1.2E-04 	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characteriza (RCR) exposure to human	iction ind/calculation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio s via the enviru	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01 onment: te Expos	ECETOO ation expo R) PETROF marine water 2.3E-06 9.8E-04 ure estimation	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 Soil 3.6E-06 2.7E-04 Risk chai	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 marine sediment 3.8E-04 1.2E-04 	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characteriza (RCR) exposure to human	iction ind/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio S via the enviru xposure rout	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01 onment: te Expos (µ	ECETOO ation expo R) PETROF marine water 2.3E-06 9.8E-04 ure estimation g/kg/day) 6.8E-05	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34 RISK v7.04 Soil 3.6E-06 2.7E-04 Risk chai	Risk characterisatio n ratio (RCR) <0.01 0.033 0.326 0.326 <0.01 freshwater sediment 1.4E-01 9.8E-02 racterisation ratio (R	Combined Risk characterisation r (RCR) <0.01 0.342 0.79 0.944 0.07 marine sediment 3.8E-04 1.2E-04 	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characterize (RCR) exposure to human	iction nod/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio s via the enviru xposure rout Oral Inhalation	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01 onment: te Expos (µ	ECETOO ation expo R) PETROF marine water 2.3E-06 9.8E-04 ure estimation g/kg/day) 6.8E-05 7 1E-06	C TRA Dermal dermal sure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characterize (RCR) exposure to human	iction ind/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio s via the enviru xposure rout Oral Inhalation ombined route	n model) Inhalation In	ECETOO ation expo R) PETROF marine water 2.3E-06 9.8E-04 ure estimation g/kg/day) 6.8E-05 7.1E-06 7.5E-05	C TRA Dermal dermal sure(mg/kg bw/day) 0.034 1.37 13.71 13.71 0.34 RISK v7.04 Soil 3.6E-06 2.7E-04 Risk char	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01	atio
3.1 Hum Exposure Pro 3.2 Envi Exposure	an exposure pred e assessment (met cess category [PROC] PROC1 PROC2 PROC8a PROC8b PROC16 ronmental exposu e assessment (met environmental Predicted Envir Exposure (PEC) Risk Characterize (RCR) exposure to human	iction ind/calculation inhalation exposure (mg/m ³) 0.091 45.41 68.12 90.83 9.083 re prediction nod/calculation exposure onmental (Regional) ation Ratio s via the enviru xposure rout Oral Inhalation ombined route	n model) Inhalation Risk characteris ratio (RC <0.01 0.309 0.463 0.618 0.062 n model) freshwater 9.2E-04 3.4E-01 onment: te Expos (µ	ECETO(ation expo R) PETROF marine water 2.3E-06 9.8E-04 ure estimation g/kg/day) 6.8E-05 7.1E-06 7.5E-05	C TRA Dermal dermal ssure(mg/kg bw/day) 0.034 1.37 13.71 13.71 13.71 0.34 RISK v7.04 Soil 3.6E-06 2.7E-04 Risk chai	Risk characterisatio n ratio (RCR) <0.01	Combined Risk characterisation r (RCR) <0.01	atio

4. Evaluation guidance to downstream user

For scaling see

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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Date of issue: 20th December 2023 Version: 1.0

Exposure assessment	Workers	TRA Workers 3.0
instrument/tool/method	Environmental exposure	PETRORISK v7.04

Exposure Scenario 9: Widespread use by professional workers – (Use in coatings)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 Roller application or brushing PROC11 Non industrial spraying PROC13 Treatment of articles by dipping and pouring PROC15 Use as laboratory reagent PROC19 Hand-mixing with intimate contact and only PPE available
Environmental release categories [ERC]	ERC8a Wide dispersive indoor use of processing aids in open systems ERC8d Wide dispersive outdoor use of processing aids in open systems

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension				
Concentration of substance in product	All PROC's	100			
Human factors not influenced by risk mana	agement				
Frequency and duration of use					
Exposure duration per day	All PROC's	8hr			
Other operational conditions affecting wor	ker exposure				
Area of use	PROC1, PROC2, PROC3, PROC4 (CS9), PROC5 (CS7) (CS10), PROC8a, PROC8b, PROC10 (CAS14), PROC13 (CS16), PROC11 (CS18), PROC15, PROC19 (CS21)	Indoor			
	PROC4 (CS8), PROC5 (CS11), PROC10 (CS15), PROC11 (CS19), PROC13 (CS17) (CS20), PROC19 (CS22)	Outdoor			
Operating temperature	All PROC's	<= 40 °C			
Vapour pressure	All PROC's	288.8 Pa			

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Ávoid inhalation of vapours.

Organisational measures	
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed
Technical conditions of use	
PROC1	Use in closed process, no likelihood of exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)

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Date of issue: 20th December 2023 Version: 1.0

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

PROC2	Use in closed, continuous process with occasional controlled exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)			
PROC3 (CS5)	Use in contained b Safety Manageme Basic general vent	batch processes. Local exhaust nt System: Basic tilation (1-3 air changes per hou	ventilation – Not required. Occupational Health and	
PROC3 (CS6), PROC4, PROC5, PROC8b, PROC10 (CS15), PROC11 (CS19), PROC13, PROC15, PROC19 (CS22)	Local exhaust ventilation – Not required. Occupation Basic Basic general ventilation (1-3 air changes per hour		onal Health and Safety Management System:	
PROC8a, PROC10 (CS14), PROC11 (CS18), PROC19 (CS21)	Local exhaust ven Basic Enhanced general	tilation – Not required. Occupative ventilation (5-10 air changes per	onal Health and Safety Management System: er hour)	
Risk management measures related to hur	nan health			
Respiratory protection	PROC1, PROC2, PROC8a, PROC8 PROC15, PROC15	PROC3, PROC4, PROC5, b, PROC10 (CS14), PROC13, 9 (CS21)	Not required	
	PROC10 (CS15), (CS22)	PROC11 (CS19), PROC19	Yes (APF >= 10)	
PROC1, PRO PROC8a, PF PROC15		PROC3, PROC4, PROC5, b, PROC10 (CS15), PROC13,	Not required	
	PROC10 (CS14), PROC11, PROC19		Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal treatment effectiveness: 80%	
Eye Protection	Not required			
2.2 Control of environmental exposure				
Amounts used				
Annual site tonnage (tons/year):		<= 1E4		
Maximum daily site tonnage (kg/day):		<= 1.37		
Operational conditions				
Emission days (days/year):				
Emission days (days/year):		3.7E+02		
Emission days (days/year): Release fraction to air from process (initial rel RMM):	ease prior to	3.7E+02 98%		
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process to RMM):	ease prior to (initial release prior	3.7E+02 98% 1%		
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process to RMM): Local release rate (Water) (kg/day)	ease prior to (initial release prior	3.7E+02 98% 1% 0.014 kg/day		
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures	ease prior to (initial release prior to reduce or limit of	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and	releases to soil	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a	ease prior to (initial release prior to reduce or limit of entrations of airborn nd/or thermal oxidat	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below ion and/or vapour recovery, ads	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below ion and/or vapour recovery, ads r filtration and/or thermal oxidation	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions.	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to ion and/or vapour recovery, ads r filtration and/or thermal oxidation	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air plicable as there is r	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to ion and/or vapour recovery, ads r filtration and/or thermal oxidation to release to wastewater.	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit r	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air plicable as there is r elease from site	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to ion and/or vapour recovery, ads r filtration and/or thermal oxidation to release to wastewater.	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit r Process optimized for efficient use of raw mat	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air plicable as there is r elease from site erials.	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to ion and/or vapour recovery, ads r filtration and/or thermal oxidation to release to wastewater.	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit r Process optimized for efficient use of raw mat Release factor before on-site RMM (Air)	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air plicable as there is r elease from site erials.	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below the ion and/or vapour recovery, ads r filtration and/or thermal oxidation to release to wastewater. 98% 089%	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit r Process optimized for efficient use of raw mat Release factor before on-site RMM (Air) Release factor before on-site RMM (Air)	ease prior to (initial release prior to reduce or limit of entrations of airborn ind/or thermal oxidat et scrubber and/or air plicable as there is r elease from site erials.	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below the ion and/or vapour recovery, ads r filtration and/or thermal oxidation the release to wastewater. 98% 98% 1%	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	
Emission days (days/year): Release fraction to air from process (initial rel RMM): Release fraction to wastewater from process (to RMM): Local release rate (Water) (kg/day) Technical onsite conditions and measures Typical measures to maintain workplace conc removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit r Process optimized for efficient use of raw mat Release factor before on-site RMM (Air) Release factor after on-site RMM (Water)	ease prior to (initial release prior to reduce or limit of entrations of airborn nd/or thermal oxidat et scrubber and/or air plicable as there is r elease from site erials.	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below the ion and/or vapour recovery, ads r filtration and/or thermal oxidation the release to wastewater. 98% 98% 1% 1%	<i>releases to soil</i> respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	45.41	0.309	1.37	0.033	0.342
PROC3	27.25	0.185	0.69	0.016	0.202
PROC4 (CS8)	63.58	0.433	6.86	0.163	0.596
PROC4 (CS9)	90.83	0.618	6.86	0.163	0.781
PROC5 (CS7) (CS10)	90.83	0.618	13.71	0.326	0.944
PROC5 (CS11)	63.58	0.433	13.71	0.326	0.759
PROC8a	68.12	0.463	13.71	0.326	0.79

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Date of issue: 20th December 2023 Version: 1.0

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PROC8b 90.83 0.618 13.71 0.326	0.944						
PROC10 (CS14) 68.12 0.463 5.486 0.131	0.594						
PROC10 (CS15) 15.89 0.108 27.43 0.653	0.761						
PROC11 (CS18) 54.5 0.371 21.42 0.51	0.881						
PROC11 (CS19) 12.71 0.087 21.42 0.51	0.597						
PROC13 (CS16) 90.83 0.618 13.71 0.326	0.944						
PROC13 (CS17) (CS20) 63.58 0.433 13.71 0.326	0.759						
PROC15 45.41 0.309 0.34 <0.01	0.317						
PROC19 (CS21) 40.87 0.278 28.28 0.673	0.952						
PROC19 (CS22) 9.537 0.065 28.28 0.673	0.738						
3.2 Environmental exposure prediction							
Exposure assessment (method/calculation model) PETRORISK v7.04	Exposure assessment (method/calculation model) PETRORISK v7.04						
sediment							
Predicted Environmental Exposure (PEC) (Regional)9.4E-044.3E-061.2E-031.5E-01	1.6E-03						
Risk Characterization Ratio (RCR)3.5E-011.8E-033.1E-031.1E-01	9.1E-04						
Indirect exposure to humans via the environment:							
Exposure route Exposure estimation Risk characterisation ratio ((µg/kg/day)	RCR)						
Oral 6.8E-05 7.0E-05							
Inhalation 7.1E-06 7.1E-06							

4. Evaluation guidance to downstream user For scaling see Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Exposure assessment instrument/tool/method Workers TRA Workers 3.0 Environmental exposure PETRORISK v7.04

Exposure Scenario 10: Widespread use by professional workers (Use in lubricants) - High environmental release

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC11 Non industrial spraying PROC13 Treatment of articles by dipping and pouring PROC17 Lubrication at high energy conditions and in partly open process PROC20 Heat and pressure transfer fluids in dispersive, professional use but closed systems
Environmental release categories [ERC]	ERC8a Wide dispersive indoor use of processing aids in open systems ERC8d Wide dispersive outdoor use of processing aids in open systems

2.0 Operational conditions and risk management measures 2.1 Control of worker exposure Product characteristics Physical form of product Liquid / Includes: Paste / Slurry / Suspension Concentration of substance in product All PROC's 100

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Date of issue: 20th December 2023 Version: 1.0

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Human factors not influenced by risk management				
Frequency and duration of use	J			
Exposure duration per day	All PROC's		8hr	
Other operational conditions affecting work	ker exposure			
	PROC1 PROC2	PROC3 PROC8a PROC8h		
Area of use	PROC13, PROC1 PROC20	1, PROC17 (CS12) (CS13),	Indoor	
	PROC17 (CS14) (CS15)	Outdoor	
Operating temperature	All PROC's	ł	<= 40 °C	
Vapour pressure	All PROC's		288.8 Pa	
General measures applicable to all activitie	S			
Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. General measures (skin irritants) Avoid contact with skin and eves. Avoid inhalation of vapours.				
Organisational measures				
All PROC's	Occupational Heal controls assumed	th and Safety Guidelines - Mana	agement System: Advanced (industrial) exposure	
Technical conditions of use				
PROC2, PROC3, PROC8b, PROC13, PROC17 (Operation and lubrication of high energy open equipment; Outdoor), PROC17 (Operation and lubrication of high energy open equipment; With potential for aerosol generation; Outdoor), PROC20	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)			
PROC8a, PROC11	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Room Ventilation: Enhanced (5 to10 ACH)			
PROC17 (Operation and lubrication of high energy open equipment; Indoor) (Operation and lubrication of high energy open equipment; With potential for aerosol generation; Indoor)	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Enhanced general ventilation (5-10 air changes per hour))			
Risk management measures related to human health				
Respiratory protection	PROC1, PROC2, I PROC13, PROC2	PROC3, PROC8a, PROC8b, 0	Not required	
	PROC11, PROC1	7	Yes (APF >= 10)	
	PROC1, PROC2, I PROC13, PROC1	PROC3, PROC8a, PROC8b, 7 (CS14) (CS15), PROC20	Not required	
Hand and/or Skin protection	PROC11, PROC1	7 (CS12) (CS13)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal treatment effectiveness: 80%	
Eye Protection	Not required			
2.2 Control of environmental exposure				
Amounts used				
Annual site tonnage (tons/year):		<= 2E4		
Iviaximum daily site tonnage (kg/day): <= 2.74				
Emission days (days/year): 3		3./E+02		
Release fraction to an from process (initial release prior to 1.5%				
to RMM): 5%				
Local release rate (Water) (kg/day)		0.137 kg/day		
recrinical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil				
I ypical measures to maintain workplace concerned removal and/or air filtration, particle removal and	entrations of airborne	e vOCs and particulates below r ion and/or vapour recovery, ads	espective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
auditional all treatment measures, such as wet scrubber and/or all nitration and/or thermal oxidation and/or vapour recovery systems, in order to achieve a reduction of the air emissions				
achieve a reduction of the air emissions.				

Equipment cleaning and maintenance: Not applicable as there is no release to wastewater.

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Date of issue: 20th December 2023 Version: 1.0

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Organisational measures to prevent/limit release from site		
Process optimized for efficient use of raw materials.		
Substance release quantities after risk management measures		
Release factor before on-site RMM (Air)	1.5%	
Release factor after on-site RMM (Air)	1.5%	
Release factor before on-site RMM (Water)	5%	
Release factor after on-site RMM (Water)	5%	
Release factor after on-site RMM (soil)	5%	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	45.41	0.309	1.37	0.033	0.342
PROC3	27.25	0.185	0.69	0.016	0.202
PROC8a	68.12	0.463	13.71	0.326	0.79
PROC8b	90.83	0.618	13.71	0.326	0.944
PROC11	27.25	0.185	21.42	0.51	0.696
PROC13	90.83	0.618	13.71	0.326	0.944
PROC17 (CS12) (CS13)	31.79	0.216	5.486	0.131	0.347
PROC17 (CS14) (CS15)	31.79	0.216	27.43	0.653	0.869
PROC20	45.41	0.309	1.71	0.041	0.35

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	1.1E-03	2.0E-05	1.2E-02	1.6E-01	1.6E-02
Risk Characterization Ratio (RCR)	4.3E-01	8.1E-03	3.1E-02	9.1E-02	9.1E-03

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	8.6E-05
Inhalation	7.1E-06	7.3E-06
Combined routes	7.5E-05	9.4E-05

4. Evaluation guidance to downstream user

For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are		
5	managed to at least equivalent levels.		
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Exposure Scenario 11: Widespread use by professional workers (Use in water treatment)

1.0 Contributing Scenarios	
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation)

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Date of issue: 20th December 2023 Version: 1.0

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

	PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13 Treatment of articles by dipping and pouring
Environmental release categories [ERC]	ERC8a Wide dispersive indoor use of processing aids in open systems ERC8d Wide dispersive outdoor use of processing aids in open systems

2.0 Operational conditions and risk management measures

2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension			
Concentration of substance in product	All PROC's	100		
Human factors not influenced by risk mana	agement			
Frequency and duration of use				
Exposure duration per day	All PROC's	8hr		
Other operational conditions affecting worker exposure				
Area of use	All PROC's	Indoor		
Operating temperature	All PROC's	<= 40 °C		
Vapour pressure	All PROC's	288.8 Pa		

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

General measures (skin irritants)

Avoid contact with skin and eyes. Avoid inhalation of vapours.

Organisational measures			
All PROC's	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed		
Technical conditions of use			
PROC1, PROC2, PROC3, PROC4, PROC8b, PROC13	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)		
PROC8a	Local exhaust ven Basic Enhanced general	tilation – Not required. Occupation I ventilation (5-10 air changes pe	onal Health and Safety Management System: er hour)
Risk management measures related to hun	nan health		
Respiratory protection	All PROC's		Not required
Hand and/or Skin protection	All PROC's		Not required
Eye Protection	Not required		
2.2 Control of environmental exposure			
Amounts used			
Annual site tonnage (tons/year):		<= 7E3	
Maximum daily site tonnage (kg/day):		<= 2.98	
Operational conditions			
Emission days (days/year):		3.7E+02	
Release fraction to air from process (initial release prior to RMM):		1%	
Release fraction to wastewater from process (initial release prior to RMM):		50%	
Local release rate (Water) (kg/day)		1.49 kg/day	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil			
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or t			
achieve a reduction of the air emissions.			
Equipment cleaning and maintenance: Not applicable as there is no release to wastewater.			
Organisational measures to prevent/limit r	elease from site		
Process optimized for efficient use of raw materials.			
Substance release quantities after risk management measures			
Release factor before on-site RMM (Air)		1%	

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Date of issue: 20th December 2023 Version: 1.0

Release factor after on-site RMM (Air)	1%
Release factor before on-site RMM (Water)	50%
Release factor after on-site RMM (Water)	50%
Release factor after on-site RMM (soil)	0%

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

	Inhalation		Derma	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	45.41	0.309	1.37	0.033	0.342
PROC3	27.25	0.185	0.69	0.016	0.202
PROC4	98.83	0.618	6.86	0.163	0.781
PROC8a	68.12	0.463	13.71	0.326	0.79
PROC8b	90.83	0.618	13.71	0.326	0.944
PROC13	90.83	0.618	13.71	0.326	0.944

ECETOC TRA

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	2.2E-03	2.2E-04	1.3E-01	1.7E+00	1.7E-01
Risk Characterization Ratio (RCR)	8.8E-01	8.8E-02	3.4E-01	1.0E+00	1.0E-01

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	2.0E-04
Inhalation	7.1E-06	9.0E-06
combined routes	7.5E-05	2.1E-04

4. Evaluation guidance to downstream user			
For scaling see	Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.		
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Exposure Scenario 12: Widespread use by professional workers (Use in functional fluids)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC20 Heat and pressure transfer fluids in dispersive, professional use but closed systems

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Date of issue: 20th December 2023 Version: 1.0

Environmental release categories [ERC]

ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems

2.0 Operational conditions and risk management measures				
2.1 Control of worker exposure	2.1 Control of worker exposure			
Product characteristics				
Physical form of product	Liquid / Includes: F	Paste / Slurry / Suspension		
Concentration of substance in product	All PROC's		100	
Human factors not influenced by risk mana	gement			
Frequency and duration of use				
Exposure duration per day	All PROC's		8hr	
Other operational conditions affecting work	ker exposure			
Area of use	All PROC's		Indoor	
Operating temperature	All PROC's		<= 40 °C	
Vapour pressure	All PROC's		288.8 Pa	
General measures applicable to all activities Assumes a good basic standard of occupation using measures such as contained or enclose Drain down systems and clear transfer lines pi Where there is potential for exposure: Ensure exposures; Ensure suitable personal protective requirements; monitor effectiveness of control General measures (skin irritants) Avoid contact with skin and eyes. Avoid inhala	General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. maximum process temperature: 40°C. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. General measures (skin irritants) Avoid contact with skin and even. Avoid inhelation of vapours			
Organisational measures				
All PROC's	Occupational Heal	Ith and Safety Guidelines - Mana	gement System: Advanced (industrial) exposure	
Technical conditions of use	controls assumed			
recrifical conditions of use	Local oxpaust yon	tilation Not required Occupation	anal Health and Safety Management System:	
PROC1, PROC2, PROC3, PROC9, PROC20	Basic Basic general vent	tilation (1-3 air changes per hour)	
PROC8a	Local exhaust ventilation – Not required. Occupational Health and Safety Management S Basic Enhanced general ventilation (5-10 air changes per hour)		onal Health and Safety Management System: r hour)	
Risk management measures related to hun	nan health			
Respiratory protection	All PROC's		Not required	
Hand and/or Skin protection	All PROC's		Not required	
Eye Protection	Not required			
2.2 Control of environmental exposure	2.2 Control of environmental exposure			
Amounts used				
Annual site tonnage (tons/year):		<= 2E4		
Maximum daily site tonnage (kg/day):		<= 2.74		
Operational conditions				
Emission days (days/year):		3.7E+02		
Release fraction to air from process (initial rele RMM):	ease prior to	5%		
Release fraction to wastewater from process (nitial release prior	5%		
Local release rate (Water) (kg/day)		0 137%		
Technical onsite conditions and measures	to reduce or limit o	discharges, air emissions and	releases to soil	
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to achieve a reduction of the air emissions.				
Equipment cleaning and maintenance: Not applicable as there is no release to wastewater.				
Organisational measures to prevent/limit release from site				
Process optimized for efficient use of raw materials.				
Substance release quantities after risk management measures				
Release factor before on-site RMM (Air)		5%		
Release factor after on-site RMM (Air)		5%		
Release factor before on-site RMM (Water)		5%		
Release factor after on-site RMM (Water)		5%		
Release factor after on-site RMM (soil)		5%		

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Date of issue: 20th December 2023 Version: 1.0

3. Exposure estimation and reference to its source									
3.1 Human exposure pre	diction								
Exposure assessment (m	ethod/cal	culation n	nodel)		ECETOC	TRA			
		In	halation			Dermal		Combined	
Process category [PROC]	inha exp (m	alation osure q/m³)	Ris character ratio (I	k risation RCR)	c expos b	lermal sure(mg/kg w/day)	Risk characterisatio n ratio (RCR)	Risk characterisation (RCR)	ratio
PROC1	0	.091	<0.0)1		0.034	<0.01	<0.01	
PROC2	4	5.41	0.30)9		1.37	0.033	0.342	
PROC3	2	7.25	0.18	35		0.69	0.016	0.202	
PROC8a	6	8.12	0.46	63		13.71	0.326	0.79	
PROC9	9	0.83	0.6	18		6.86	0.163	0.781	
PROC20	4	5.41	0.30)9		1.71	0.041	0.35	
3.2 Environmental expo	sure pre	diction							
Exposure assessment (m	ethod/cal	culation n	nodel)		PETROR	ISK v7.04			
environmental expo	sure	frest	nwater	marine	e water	soil	freshwater sediment	marine sediment	
Predicted Environme Exposure (PEC) (Reg	ental ional)	1.1	E-03	2.08	E-05	1.2E-02	1.6E-01	1.6E-02	
Risk Characterization (RCR)	Ratio	4.3	E-01	8.1E	E-03	3.1E-02	9.1E-02	9.1E-03	
Indirect exposure to huma	ans via th	e environ	ment:						
	Exposure route Exposure est		mation	Risk char	racterisation ratio (RCR)			
	0	Oral 6.8E-0		8.6E-05					
	Inha	Inhalation 7.1E-06		;	7.3E-06				
	combine	ed routes	s 7.5E-05		,	9.4E-05			
4 Evelvetien muideneed	o douroo								

4. Evaluation guidance to downstream user			
For scaling see	Where other risk management mea managed to at least equivalent leve	asures/operational conditions are adopted, then users should ensure that risks are els.	
Exposure assessment	Workers	TRA Workers 3.0	
instrument/tool/method	Environmental exposure	PETRORISK v7.04	

Exposure Scenario 13: Widespread use by professional workers (Use in functional fluids)

1.0 Contributing Scenarios			
Sector of uses SU	SU0 Other		
Process category [PROC]	PROC3 Use in closed batch process (synthesis or formulation) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large		
	containers at dedicated facilities PROC10 Roller application or brushing ERC8d Wide dispersive outdoor use of processing aids in open systems		
Environmental release categories [ERC]	ERC8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix		

2.0 Operational conditions and risk management measures			
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension		

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Date of issue: 20th December 2023 Version: 1.0

Concentration of substance in product	All PROC's		100	
Human factors not influenced by risk mana	an factors not influenced by risk management			
Frequency and duration of use	gement			
Exposure duration per day	Exposure duration per day All PROC's 8hr			
Other operational conditions affecting wor				
Area of use			Indoor	
Area of use				
			288 8 Do	
Conoral massures applicable to all activitie	AIIFROUS		200.0 Fd	
Assumes a good basis standard of assumation	s si bugiono io implon	nonted maximum process temp	aratura: 40°C Control any natantial avecaura	
Assumes a your basic standard of occupation	d systems properly	designed and maintained facilitie	erature. 40 C. Control any potential exposure	
Drain down systems and clear transfer lines of	rior to breaking cont	ainment Drain down and flush e	auinment where possible prior to maintenance	
Where there is notential for exposure: Ensure	relevant staff are inf	formed of the nature of exposure	and aware of basic actions to minimise	
exposures: Ensure suitable personal protective	equinment is avail	able. Clear up spills and dispose	of waste in accordance with regulatory	
requirements: monitor effectiveness of control	measures: consider	the need for health surveillance	· identify and implement corrective actions	
General measures (skin irritants)				
Avoid contact with skin and eves. Avoid inhala	tion of vapours.			
Organisational measures				
	Occupational Hea	Ith and Safety Guidelines - Mana	agement System: Advanced (industrial) exposure	
All PROC's	controls assumed			
Technical conditions of use				
	Local exhaust ven	tilation – Not required. Occupation	onal Health and Safety Management System:	
PROC3, PROC8b	Basic			
	Basic general ven	tilation (1-3 air changes per hour)	
	Local exhaust ven	tilation – Not required Occupation	onal Health and Safety Management System:	
PROC8a PROC10	Basic		shar noalth and carety management cyclom.	
	Enhanced general ventilation (5-10 air changes per hour)			
Risk management measures related to hun	nan health			
Respiratory protection	All PROC's		Not required	
	PROC3 PROC8a	PROC8h	Not required	
	111000,1110000	, 110000	Wear chemically resistant gloves (tested to	
Hand and/or Skin protection	PROC10		FN374) in combination with specific activity	
			training. Dermal treatment effectiveness: 80%	
Eve Protection	Not required			
2.2 Control of environmental exposure				
Amounts used				
Annual site tonnage (tons/year):		<= 1F4		
Maximum daily site tonnage (kg/day):		<= 1.37		
Operational conditions		- 1.01		
Emission days (days/year):		3 7E+02		
Release fraction to air from process (initial rele	ase prior to	0.72.02		
RMM).		95%		
Release fraction to wastewater from process (initial release prior			
to RMM).	initial release prior	1%		
Local release rate (Water) (kg/day)		0.014 kg/day		
Local release rate (Water) (kg/day) 0.014 kg/day			releases to soil	
Typical managerea to maintain workplace conditions	ontrations of sirborn	a VOCa and particulates below r	releases to soll	
Typical measures to maintain workplace concentrations of another vocs and particulates below respective OLEs. e.g. thermal workplace scheduler, gas				
additional air treatment measures such as what service and/or air filtrain and/or thermal avidation and/or vapour receivery, austipution. Oppiade of the system in prace of				
achieve a reduction of the air emissions			in and/or vapour recovery systems, in order to	
Equipment cleaning and maintenance: Not applicable as there is no release to wastewater				
Lyupment organing and manuferiance. Not applicable as there is no release to wastewater.				
Organisational medicates to prevention in creates non site				
Frouss optimized for since the management massures				
Boloopo fostor boforo on site DMM (Air)	agement measure			
Release factor before on-site Rivilvi (AIF)		93% 05%		
		90%		
Release factor before on-site RMM (Water)		1%		
Release factor after on-site RMM (Water)		1%		
Release factor after on-site RIVIIVI (soll)		4%		

3. Exposure estimation and reference to its source			
3.1 Human exposure prediction			
Exposure assessment (method/calculation model)	ECETOC TRA		

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Date of issue: 20th December 2023 Version: 1.0

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	Inhalation				Dermal		Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Ris characte ratio (sk risation RCR)	expo k	dermal sure(mg/kg w/day)	Risk characterisatio n ratio (RCR)	Risk cha	racterisation rat (RCR)
PROC3	27.25	0.1	85		0.69	0.016		0.202
PROC8a	68.12	0.4	63		13.71	0.326		0.79
PROC8b	90.83	0.6	18		13.71	0.326		0.944
PROC10	68.12	0.4	63		5.486	0.131		0.594
3.2 Environmental exposu	ire prediction							
Exposure assessment (met	hod/calculation r	nodel)		PETROR	ISK v7.04			
environmental exposi	ure fres	hwater	marine	e water	soil	freshwater sediment	mari	ne sediment
Predicted Environmen Exposure (PEC) (Regio	tal 1.1 nal)	E-03	2.08	Ξ-05	1.2E-02	1.6E-01		1.6E-02
Risk Characterization R (RCR)	atio 4.3	8E-01	8.16	Ξ-03	3.1E-02	9.1E-02		9.1E-03
Indirect exposure to human	s via the environ	ment:						
Indirect exposure to human	s via the environ xposure route	ment: Exp	osure esti (µg/kg/da	mation ay)	Risk cha	racterisation ratio (I	RCR)	
Indirect exposure to human	s via the environ xposure route	ment: Exp	osure esti (µg/kg/da 6.8E-05	mation ay)	Risk cha	racterisation ratio (I 8.6E-05	RCR)	
Indirect exposure to human	s via the environ xposure route Oral Inhalation	ment: Exp	osure esti (µg/kg/da 6.8E-05 7.1E-06	mation ay)	Risk char	racterisation ratio (1 8.6E-05 7.3E-06	RCR)	

4. Evaluation guidance to de	ownstream user	
For scaling see	Where other risk management mean managed to at least equivalent levels	asures/operational conditions are adopted, then users should ensure that risks are els.
Exposure assessment	Workers	TRA Workers 3.0
instrument/tool/method	Environmental exposure	PETRORISK v7.04

Exposure Scenario 14: Widespread use by professional workers (Use in explosive manufacturing and use)

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
Process category [PROC]	 PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Environmental release categories [ERC]	ERC8e Wide dispersive outdoor use of reactive substances in open systems

2.0 Operational conditions and risk manage	ement measures		
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension		
Concentration of substance in product	All PROC's	100	
Human factors not influenced by risk mana	ngement		
Frequency and duration of use			
Exposure duration per day	All PROC's	8hr	
Other operational conditions affecting wor	ker exposure		

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Area of use	All PROC's		Indoor		
Operating temperature	All PROC's		<= 40 °C		
Vapour pressure	All PROC's		288 8 Pa		
General measures applicable to all activitie	s				
Assumes a good basic standard of occupation using measures such as contained or enclose Drain down systems and clear transfer lines p Where there is potential for exposure: Ensure exposures; Ensure suitable personal protectiv requirements; monitor effectiveness of control	al hygiene is implem d systems, properly ior to breaking conta relevant staff are infe e equipment is availa measures; consider	nented. maximum process tempo designed and maintained facilitio ainment. Drain down and flush e ormed of the nature of exposure able; Clear up spills and dispose the need for health surveillance	erature: 40°C. Control any potential exposure es and a good standard of general ventilation. equipment where possible prior to maintenance. and aware of basic actions to minimise of waste in accordance with regulatory c; identify and implement corrective actions.		
Avoid contact with skin and eyes. Avoid inhala	tion of vapours.				
Organisational measures					
All PROC's	Occupational Heal controls assumed	th and Safety Guidelines - Mana	agement System: Advanced (industrial) exposure		
Technical conditions of use					
PROC1, PROC2, PROC3, PROC5, PROC8b	C3, PROC5, Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)				
PROC8a	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Enhanced general ventilation (5-10 air changes per hour)				
Risk management measures related to hun	an health				
Respiratory protection	All PROC's		Not required		
Hand and/or Skin protection	All PROC's		Not required		
Eye Protection	Not required				
2.2 Control of environmental exposure					
Amounts used					
Annual site tonnage (tons/year):		<= 2E4			
Maximum daily site tonnage (kg/day):		<= 2.74			
Operational conditions					
Emission days (days/year):		3.7E+02			
Release fraction to air from process (initial rele RMM):	ease prior to	0.5%			
Release fraction to wastewater from process (to RMM):	initial release prior	5E-4 %			
Local release rate (Water) (kg/day)		1.37E-5 kg/day			
Technical onsite conditions and measures	to reduce or limit o	lischarges, air emissions and	releases to soil		
Typical measures to maintain workplace concered removal and/or air filtration, particle removal a additional air treatment measures, such as we achieve a reduction of the air emissions.	entrations of airborne nd/or thermal oxidati t scrubber and/or air	e VOCs and particulates below r ion and/or vapour recovery, adso filtration and/or thermal oxidation	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or on and/or vapour recovery systems, in order to		
Equipment cleaning and maintenance: Not ap	plicable as there is n	o release to wastewater.			
Organisational measures to prevent/limit re	elease from site				
Process optimized for efficient use of raw mate	erials.				
Substance release quantities after risk mar	agement measure	s			
Release factor before on-site RMM (Air)		0.5%			
Release factor after on-site RMM (Air)		0.5%			
Release factor before on-site RMM (Water)		5E-4 %			
Release factor after on-site RMM (Water)					
Release lactor after on-site Rivivi (SOII)		0.01%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) ECETOC TRA

	In	halation	Dermal	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisatio n ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.091	<0.01	0.034	<0.01	<0.01
PROC2	45.41	0.309	1.37	0.033	0.342
PROC3	27.25	0.185	0.69	0.016	0.202
PROC5	90.83	0.618	13.71	0.326	0.944

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Date of issue: 20th December 2023 Version: 1.0

PROC8a PROC8b		68.12 90.83	0.46 0.61	63 18		13.71 13.71	0.326 0.326		0.79 0.944	
3.2 Environmental exposure prediction										
Exposure assessment	(method/c	alculation m	iodel)		PETROR	ISK v7.04				
environmental exposure freshwater marine water soil freshwater marine sediment										
Predicted Enviror Exposure (PEC) (F	nmental Regional)	9.2	E-04	2.3E	E-06	6.6E-04	1.4E-01		3.7E-04	
Risk Characterizat (RCR)	ion Ratio	3.4	E-01	9.8E	E-04	2.6E-04	9.8E-02		1.2E-04	
Indirect exposure to h	umans via	the environr	nent:						_	
	Expos	sure route	Expe	osure esti (µg/kg/da	mation y)	Risk char	acterisation ratio (I	RCR)		
		Oral		6.8E-05			6.8E-05			
	Inh	alation		7.1E-06			7.1E-06			
	combi	ned routes		7.5E-05			7.5E-05		J	

4. Evaluation guidance to downstream user

For scaling see	Where other risk management me	asures/operational conditions are adopted, then users should ensure that risks are
-	managed to at least equivalent lev	els.
Exposure assessment	Workers	TRA Workers 3.0
instrument/tool/method	Environmental exposure	PETRORISK v7.04

Exposure Scenario 15: - Consumer use - Uses in coatings

1.0 Contributing Scenarios	
Chemical product category [PC]	PC1 Adhesives, sealants PC4 Anti-Freeze and de-icing products PC8 Biocidal products (e.g. Disinfectants, pest control) PC9a Coatings and paints, thinners, paint removers PC9b Fillers, putties, plasters, modelling clay PC9c Finger paints PC15 Non-metal-surface treatment products PC18 Ink and toners PC23 Leather tanning, dye, finishing, impregnation and care products PC24 Lubricants, greases, release products PC34 Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Environmental release categories [ERC]	ERC8a Wide dispersive indoor use of processing aids in open systems ERC8d Wide dispersive outdoor use of processing aids in open systems

2.0 Operational conditions and risk managed	jement mea	sures			
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid PC24 (CS	S28): Paste			
Physical form of product Li Pr Concentration of substance in product		Chemical product category [PC]	Category	%	
Concentration of substance in product		PC1	CS2	30	
Concentration of substance in product			CS6	<= 1	
		PC4	CS7	<= 10	
			CS8	<= 50	
		PC8	CS9	<= 5	l

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Hartree®

Date of issue: 20th December 2023 Version: 1.0

			CS10	<= 5	
			CS11	<= 15	9
			CS12	<= 1.5	5
	PC	C9a	CS13	<= 28	5
			CS14-CS15	<= 50)
			CS16-CS17	<= 2	
	PC	C9b	CS18	<= 1	
			CS19	<= 6.5	5
			CS20	<= 50)
	DC	215	CS21	<= 28	
	FV	515	CS22	<= 2	
			CS23	<= 50	
	PC	C18	CS24	<= 10	
	PC	23	CS25	<= 50	
			CS27	<= 100	0
	PC	24	CS28	<= 20	
			CS29	<= 50)
	PC	C31	CS30-CS31	<= 50)
	PC	234	CS32	<= 10	
Human factors not influenced by risk manag	ement				
	Chemica catego	I product	Category	Potential ex area	posure
			CS2	Fingerti	ps
	_	~ _	CS3	Both har	nds
	P	C1 —	CS4	Fingerti	ps
			CS5	Fingerti	ps
			CS6	-	r -
		~ –	007	Inside hand	s / one
	P	C4	CS7	hand / palm o	of hands
			CS8	Palm of one	e hand
	P	C8	All	Both har	nds
			0040.004	Inside hand	s / one
			0512-051	hand / palm o	of hands
	PC	.9a	CS14	-	
			CS15	Both har	nds
			CS16	Fingerti	ps
			CS17	Both har	nds
Potential evenesure area	PC	C9b	CS18	-	
Polential exposure area			CS10	Inside hand	s / one
			0319	hand / palm o	of hands
			CS20	-	
			CS21	Inside hands	s / one
	PC	.15		hand / palm c	of hands
			CS22	Inside hand	s / one
				hand / palm o	of hands
			CS23	Both har	nds
	PC	אוק	<u>CS24</u>	Fingerti	ps
			CS25	Inside hand	s / one
	PC	.23	0606	nanu / paim c	n rianus ade
			C020	Duiii Iidi Both bor	nde
	DC	224	CS21	Both bar	nde
	FV		CS20	Palm of h	ande
			CS30	Palm of one	anus
	PC	C31 -	<u> </u>	Roth har	nds
	PC	34	 CS32	Both har	nds
			0001	2011114	
	Chemical			Exposure route	
	product category [PC]	Category	Inhalation	Dermal	Oral
		CS2	Yes	Yes	No
		CS3	Yes	Yes	No
Exposure route	PC1	CS4	Yes	Yes	No
		CS5	Yes	Yes	No
		CS6	Yes	No	No
	PC4	CS7	Yes	Yes	No
		<u> </u>	Ves	Ves	No

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

	PC8	All	Yes	Yes	No
		CS12	Yes	Yes	No
		CS13	Yes	Yes	No
	PC9a	CS14	Yes	No	No
		CS15	Ves	Yes	No
		CS16	Voc	Voc	No
		0010	No	Vee	No
	PC9b	0010	NO	res	INO
		<u>CS18</u>	NO	Yes	Yes
		CS19	NO	Yes	Yes
		CS20	Yes	No	No
	PC15	CS21	Yes	Yes	No
	1 015	CS22	Yes	Yes	No
		CS23	Yes	Yes	No
	PC18	CS24	Yes	Yes	No
	5.000	CS25	Yes	Yes	No
	PC23	CS26	Yes	Yes	No
		CS27	Yes	Yes	No
	PC24	CS28	No	Voc	No
	F 024	0320	NU	Vee	No
		0000	Yes	res	INU N.a
	PC31	CS30	Yes	Yes	No
		CS31	Yes	Yes	No
	PC34	CS32	Yes	Yes	No
	Chomical				
	nroduct	Category		Dormal	Oral
	category [PC]	oategory	Inhalation	Exposed Area	Product
	category [FC]			Exposed Area	swallowed
		CS2	-	<= 35.73 cm ²	-
		CS3	-	<= 857.5 cm ²	-
	PC1	CS4	-	<= 35.7 cm ²	-
		 CS5		<= 35.7 cm ²	
		<u> </u>	-	-	-
	PC4	000		$< - 128 \text{ cm}^2$	_
		<u> </u>	-	<= 420 CIII <= 014.4 cm ²	-
		000	-	<= 214.4 CIII ⁻	-
		659	-	<= 857.5 cm ²	-
	PC8	CS10	-	<= 857.5 cm ²	-
		CS11	-	<= 428 cm ²	-
		CS12	-	<= 428.7 cm ²	-
	PC0a	CS13	-	<= 428.7 cm ²	
	F C9a	CS14	-	-	-
Exposed Area (cm ²) / Amounts used (cm ³)		CS15	-	<= 857.5 cm ²	-
		CS16	-	<= 35.7 cm ²	-
		CS17	-	<= 857 7 cm ²	-
	PC9b	CS18		$\leq 254.4 \text{ cm}^2$	$<= 1 \text{ cm}^{3}$
		CS10		- 204.4 Cill	$< 1.35 \text{ cm}^3$
		<u> </u>	-	-	<= 1.55 cm
	-	<u>CS20</u>	-	- - 400 7 cm ²	-
	PC15 -	0000	-	<= 420.7 CIII ⁻	-
		0.522	-	<= 428.7 cm ²	-
		CS23	-	<= 857.5 cm ²	-
	PC18	CS24	-	<= 71.4 cm ²	-
	PC23	CS25	-	<= 430 cm ²	-
	1 020	CS26	-	<= 857.5 cm ²	-
		CS27	-	<= 857.5 cm ²	-
	PC24	CS28	-	<= 857.5 cm ²	-
		CS29	-	<= 428.7 cm ²	-
		CS30	-	<= 430 cm ²	-
	PC31	CS31	-	<= 857.5 cm ²	-
	PC.34	CS32	-	<= 857.5 cm ²	-
		0002	1		1
	Chamical			Transfor factor	
	product	Category	Inhalation	Dermal	Oral
	category [PC]		innalation	Dermai	Oral
Transfer factor	PC1	All	1	1	-
		CS6	1	-	-
	PC4	CS7	1	1	-

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

	PC8	All	1	1	-
		CS12	1	1	-
	5.00	CS13	1	1	-
	PC9a	CS14	1		_
		CS15	1	1	_
		CS15	1	1	-
		0017	1	1	-
	PC9b	0010	-	1	-
		<u>CS18</u>	-	1	1
		CS19	-	1	1
		CS20	1	-	-
	PC15	CS21	1	1	-
	1010	CS22	1	1	-
		CS23	1	1	-
	PC18	CS24	1	1	-
	DC00	CS25	1	1	-
	PC23	CS26	1	1	-
		CS27	1	1	-
	PC24	CS28	-	-	1
		CS29	1	1	_
		CS30	1	1	
	PC31	CS30	1	1	
	DC24	0001	1	1	
	PC34	6532			-
Frequency and duration of use					
	Chemica	al product	Category	Exposure d	uration
	catego	ory [PC]		(hours/Ev	(ent)
		_	CS2	4	
	Р	C1	CS3	6	
		0.	CS4	4	
			CS5	1	
			CS6	0.02	
	P	°C4	CS7	0.17	
			CS8	0.25	
		CS9		0.5	
	PC8		CS10	0.33	
			 CS11	0.00	
			<u> </u>	22	
		-	<u> </u>	2.2	
	P	C9a	<u> </u>	2.2	
		-	0015	0.3	
			0010	2	
Exposure duration (nours/Event)		_	<u>CS16</u>	4	
	P	C9b	CS17	-	
			CS18	-	
			CS19	-	
	PC15		CS20	0.3	
			CS21	2.2	
			CS22	2.2	
	L		CS23	2	
	P	C18	CS24	2.2	
		<u></u>	CS25	1.23	
	P	-23	CS26	0.33	
			CS27	0.17	
	P	C24	CS28	-	
		F	CS29	0.17	
	_	004	CS30	1.23	
	P	U31 -	CS31	0.33	
	P	C34	CS32	1	
I			L	- I '	1
	Chemica	al product	Category	Use frequ	ency
	catego		AU	(event/D	ay)
			All	1	
		04	All	1	
⊢requency of use (event/Day)		80	All	1	
	P	Суа	All	1	
	P	C9b	All	1	
	P	C9b	All	1	
	P	C15	All	1	

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

	PC18	All	1
	PC23	All	1
	PC24	All	1
	PC31	All	1
	PC34	All	1
		2	1 · · ·
	Chemical product category IPC1	Category	Amounts used (a/Event))
		CS2	<= 9
		 CS3	<= 6.39F3
	PC1 -	<u> </u>	<= 85.05
		004 055	- 75
		000	<= 7.5
	PC4	<u> </u>	<= 0.5
	PC4		<= 2E3
		000	<= 4
		CS9	<= 15
	PC8	CS10	<= 27
		CS11	<= 35
		CS12	<= 2.76E3
	PC0a	CS13	<= 744
	1000	CS14	<= 215
		CS15	<= 491
Amounts used (g/Event)		CS16	<= 85
	DOOL	CS17	<= 1.38E4
	PC9b	CS18	-
		CS19	-
		CS20	<= 215
		CS21	<= 744
	PC15	CS22	<= 2 76F3
		0022 0022	<= 401
	PC18	0020	<= 491
	FCIO	0024	<= 40
	PC23	CS25	<= 56
		0526	<= 30
		0007	
		CS27	<= 2.2E3
	PC24	CS27 CS28	<= 2.2E3 <= 34
	PC24	CS27 CS28 CS29	<= 2.2E3 <= 34 <= 73
	PC24	CS27 CS28 CS29 CS30	<= 2.2E3 <= 34 <= 73 <= 142
	PC24 PC31	CS27 CS28 CS29 CS30 CS31	<= 2.2E3 <= 34 <= 73 <= 142 <= 135
	PC24 PC31 PC34	CS27 CS28 CS29 CS30 CS31 CS32	<= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115
Operational conditions	PC24 PC31 PC34	CS27 CS28 CS29 CS30 CS31 CS32	<= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115
Operational conditions	PC24 PC31 PC34	CS27 CS28 CS29 CS30 CS31 CS32	<= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115
<i>Operational conditions</i> Area of use	All PC Codes Chemical product category (PC)	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category	<= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115 Room volume (m ³)
<i>Operational conditions</i> Area of use	All PC Codes Chemical product category [PC] PC14	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category	<= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115 Room volume (m ³) >= 20
Operational conditions Area of use	All PC Codes Chemical product category [PC] PC1 PC4	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All	<pre><= 2.2E3 <= 34 <= 73 <= 142 <= 135 <= 115 </pre> Room volume (m ³) >= 20 >= 34
Operational conditions Area of use	All PC Codes Chemical product category [PC] PC1 PC4	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All	<= 2.2E3
Operational conditions Area of use	All PC Codes Chemical product PC1 PC1 PC4 PC4	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS42 CS42	<= 2.2E3
Operational conditions Area of use	All PC Codes Chemical product category [PC] PC1 PC4 PC8	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12CS13 CS14	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 21 \\ >= 24 \\ > 24 \\ > 24 \\ > 24 \\ > 24 \\ > 24 \\ > 24 \\ > 24 $
Operational conditions Area of use	All PC Codes Chemical product category [PC] PC1 PC4 PC4 PC4 PC4 PC8	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS15	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 36 \\$
Operational conditions Area of use	All PC Codes Chemical product category [PC] PC1 PC4 PC4 PC4 PC8	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes PC34 Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ = - \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ <= 100 \\ $
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9b	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ > 20 \\ > 20 $
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes All PC Codes PC1 PC4 PC8 PC9a PC9b	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ > 34 \\ >= 34 \\ > 3$
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes All PC Codes PC1 PC4 PC8 PC9a PC9b PC15	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ > 20 \\ $
Operational conditions Area of use	PC24 PC31 PC34 PC34 All PC Codes PC4 PC1 PC4 PC8 PC9a PC9b PC15	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ > = 20 \\ $
Operational conditions Area of use	PC24 PC31 PC34 PC34 PC34 PC34 All PC Codes PC1 PC1 PC4 PC8 PC9a PC9b PC15 PC18 PC18	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS18 CS19 CS20 CS21-CS22 CS23 CS24	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use	PC24 PC31 PC34 PC34 PC34 PC34 PC34 PC34 All PC Codes PC1 PC4 PC4 PC8 PC9a PC9b PC15 PC18 PC23	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ > = 20 \\ > = $
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 PC34 PC34 PC34 PC34 All PC Codes PC4 PC1 PC4 PC8 PC9a PC9b PC15 PC18 PC23	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ > 20 \\$
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 PC34 PC34 All PC Codes PC1 PC1 PC4 PC3 PC3 PC1 PC4 PC9a PC9a PC15 PC18 PC23 PC24	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 34$
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 PC34 PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC3 PC34 PC4 PC4 PC4 PC3 PC9a PC34 PC9b PC15 PC18 PC23 PC24 PC24	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 20 \\ >= 34 \\ \\ = - \\ = 20 \\ >= 2$
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 All PC Codes Chemical product category [PC] PC1 PC1 PC4 PC4 PC3 PC4 PC4 PC9a PC9b PC15 PC18 PC23 PC23 PC18 PC23 PC23	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 All PC Codes PC34 All PC Codes PC4 PC4 PC4 PC9a PC9a PC15 PC18 PC23 PC23 PC23 PC23	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31 CS32	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use Room volume	PC24 PC31 PC34 PC34 PC34 PC34 All PC Codes PC4 PC1 PC4 PC4 PC3 PC9a PC9b PC15 PC18 PC23 PC23 PC18 PC23 PC23 PC23 PC24 PC23 PC23 PC31	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31 CS32	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\ >= 20 \\ >= 34 \\ >= 20 \\$
Operational conditions Area of use Room volume Risk management measures	PC24 PC31 PC34 PC34 All PC Codes PC1 PC1 PC4 PC3 PC3 PC4 PC3 PC4 PC3 PC3 PC3 PC3 PC3 PC3 PC3 PC3 PC3 PC3 PC3 PC15 PC18 PC23 PC23 PC31 PC34	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31 CS32	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\$
Operational conditions Area of use Room volume Room volume Risk management measures Respiratory protection Unadded	PC24	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31 CS32	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\$
Operational conditions Area of use Room volume Risk management measures Respiratory protection Hand/Skin protection Hand/Skin protection	PC24 Image: Constraint of the sector of the se	CS27 CS28 CS29 CS30 CS31 CS32 Indoor Category All All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS30-CS31 CS32	$ <= 2.2E3 \\ <= 34 \\ <= 73 \\ <= 142 \\ <= 135 \\ <= 115 \\ <= 115 \\ <= 20 \\ >= 20 \\$

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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2.2 Control of environmental exposure				
Amounts used				
Annual site tonnage (tons/year):	1E4			
Maximum daily site tonnage (kg/day):	1.37			
Operational conditions				
Emission days (days/year):	3.7E+02			
Release fraction to air from process (initial release prior to	98.5%			
RMM):				
Release fraction to wastewater from process (initial release prior	1%			
to RMM):				
Local release rate (Water) (kg/day)	0.014 kg/day			
Organisational measures to prevent/limit release from site				
No specific measures identified.				
Substance release quantities after risk management measure	S			
Release factor before on-site RMM (Air)	98.5%			
Release factor after on-site RMM (Air)	98.5%			
Release factor before on-site RMM (Water)	1 %			
Release factor after on-site RMM (Water)	1 %			
Release factor after on-site RMM (soil)	0.5%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

TRA Consumers 3.1 (R15)

	Inha	alation	Dermal		0	ral	
Chemical product category [PC]	inhalation exposure (mg/m³)	Risk characterisati on ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Oral exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Combined routes
PC1 (CS2)	39.70	0.422	1.785	0.099	0	< 0.01	0.522
PC1 (CS3)	25.09	0.267	0.43	0.024	0	< 0.01	0.291
PC1 (CS4)	3.222	0.034	0.07	< 0.01	0	< 0.01	0.038
PC1 (CS5)	35.25	0.375	1.79	0.099	0	< 0.01	0.474
PC4 (CS6)	0	< 0.01	0	< 0.01	0	< 0.01	< 0.01
PC4 (CS7)	1.84	0.02	7.13	0.396	0	< 0.01	0.416
PC4 (CS8)	0.51	< 0.01	17.87	0.993	0	< 0.01	0.998
PC8 (CS9)	0.67	< 0.01	0.07	< 0.01	0	< 0.01	0.011
PC8 (CS10)	0.84	< 0.01	7.15	0.397	0	< 0.01	0.406
PC8 (CS11)	1.77	0.019	10.7	0.594	0	< 0.01	0.613
PC9a (CS12)	4.214	0.045	0.04	< 0.01	0	< 0.01	0.047
PC9a (CS13)	20.82	0.222	0.79	0.044	0	< 0.01	0.265
PC9a (CS14)	1.372	0.015	0	< 0.01	0	< 0.01	0.015
PC9a (CS15)	23.82	0.253	2.86	0.159	0	< 0.01	0.412
PC9b (CS16)	1.073	0.011	0.02	< 0.01	0	< 0.01	0.013
PC9b (CS17)	0	< 0.01	2.86	0.159	0	< 0.01	0.159
PC9b (CS18)	0	< 0.01	2.54	0.141	1	0.056	0.197
PC9b (CS19)	0	< 0.01	8.268	0.459	8.775	0.488	0.947
PC15 (CS20)	1.372	0.015	0	< 0.01	0	< 0.01	0.015
PC15 (CS21)	20.82	0.222	0.79	0.044	0	< 0.01	0.265
PC15 (CS22)	4.214	0.045	0.04	< 0.01	0	< 0.01	0.047
PC15 (CS23)	23.82	0.253	2.86	0.159	0	< 0.01	0.412
PC18 (CS24)	10.18	0.108	1.19	0.066	0	< 0.01	0.174
PC23 (CS25)	10.14	0.108	7.17	0.398	0	< 0.01	0.506
PC23 (CS26)	0.699	< 0.01	2.86	0.159	0	< 0.01	0.166
PC24 (CS27)	0.162	< 0.01	5.72	0.318	0	< 0.01	0.32
PC24 (CS28)	0	< 0.01	1.14	0.063	0	< 0.01	0.063
PC24 (CS29)	0.492	< 0.01	1.43	0.079	0	< 0.01	0.085
PC31 (CS30)	25.73	0.274	7.17	0.398	0	< 0.01	0.672
PC31 (CS31)	1.684	0.018	2.86	0.159	0	< 0.01	0.177
PC34	18.02	0.192	0.14	< 0.01	0	< 0.01	0.199
3.2 Environmental ex	posure predict	ion					
Exposure assessment	(method/calcula	ation model)	PETR	URISK v7.04			

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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environmental expo	osure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environme Exposure (PEC) (Reg	iental gional)	9.4E-04	4.3E-06	1.2E-03	1.5E-01	1.6E-03
Risk Characterization (RCR)	n Ratio	3.5E-01	1.8E-03	3.1E-03	1.1E-01	9.1E-04
Indirect exposure to humans via the environment:						
Indirect exposure to hum	nans via the	environment:				
Indirect exposure to hum	nans via the Exposure	environment:	Exposure estimation (μg/kg/day)	Risk charact	erisation ratio (RCR)
Indirect exposure to hum	nans via the Exposure Ora	e environment:	Exposure estimation (µg/kg/day) 6.8E-05	Risk charact	erisation ratio (RCR 7.0E-05)

4. Evaluation guidance to downstream user				
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for- industries-libraries.html).			
Exposure assessment	Consumer	EGRET 2, TRA Consumers 3.1 (R15)		
Instrument/tool/method	environmental exposure	PETRORISK v7.04		

7.7E-05

7.5E-05

Exposure Scenario 16: - Consumer use - Use as a fuel

combined routes

1.0 Contributing Scenarios	
Chemical product category [PC]	PC13 Fuels
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems

2.0 Operational conditions and risk management measures						
2.1 Control of worker exposure						
Product characteristics						
Physical form of product	Liquid					
	Chemica catego	l product ry [PC]	Category	%		
			CS2	<= 10		
Concentration of substance in product			CS3	<= 10		
	PC	12	CS4	<= 5		
	FC	15	CS5	<= 10		
			CS6	<= 2		
			CS7	<= 10		
Human factors not influenced by risk ma	nagement					
	Chemical catego	l product ry [PC]	Category	Potential exposure area		
			CS2	Palm of one hand		
			CS3	Palm of one hand		
Potential exposure area	PC	13	CS4	Inside hands / one hand / palm of hands		
			CS5	Palm of one hand		
			CS6	Palm of one hand		
			CS7	Palm of one hand		
Exposure route		Category		Exposure route		

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

	Ch	emical				_		
	pr	roduct		_ I	nhalation	Derm	nal	Oral
	Caley		CS2		Yes	Yes	3	No
			CS3		Yes	Yes	6	No
		2010	CS4		Yes	Yes	3	No
	ŀ	PC13	CS5		Yes	Yes	3	No
			CS6		Yes	Yes	3	No
			CS7		Yes	Yes	6	No
	Ch	emical				Transfer fa	actor	
	pr categ	roduct gory [PC]	Categor	y I	nhalation	Derm	nal	Oral
			CS2		2E-3	5E-3	3	-
Transfer factor			CS3		0.01	0.01	1	-
		0012	CS4		0.03	1E-3	3	-
	г	-013	CS5		0.05	5E-3	3	-
			CS6		0.02	1E-3	3	-
			CS7		2E-3	5E-3	3	-
Frequency and duration of use								
		Chemic categ	al product	С	ategory	Expo (h	osure du nours/Ev	iration ent)
		U			CS2	```	0.05	,
			ľ		CS3		0.017	
Exposure duration (hours/Event)		_	040		CS4		0.033	
		P	VC13		CS5		0.017	
					CS6		0.033	
					CS7		0.513	
		Chemic	al product	<u>ر</u>	ategory	Us	se freque	ency
Frequency of use (event/Day)		categ	ory [PC]		Category		event/Da	ay)
		P	PC13		All		1	
		Chemic	al product	С	ategory	An	nounts i	used
		categ					(g/Event))	
			-		<u> </u>			
Amounts used (g/Event)					<u>CS4</u>		<= 750	
		P	PC13		<u>CS5</u>		<= 750	
					CS6		<= 3 32E3	
					000 000		<= 3.2E	5
Operational conditions					00.		0.22	•
Area of use	PC13 (CS	2) (CS3) ((CS7)		Outd	oor		
	PC13 (CS	4) (CSS) (C	(56)		Indoc)r		
Risk management measures	Not so avia	a al						
Respiratory protection	Not requir	eu od						
	Not requir	eu od						
2.2 Control of environmental exposure	Not requir	eu						
Amounts used								
Annual site tonnage (tons/year)			1E6					
Maximum daily site tonnage (kg/day)			14					
Operational conditions			•••					
Emission davs (davs/vear):		3	3.7E+02					
Release fraction to air from process (initial rele	ase prior to) (0.01%					
Release fraction to wastewater from process (i	nitial releas	e prior 2	2E-5%					
to RMM): Local release rate (Water) (kg/day)		2	2.74E-6 kg/day	,				
Organisational measures to prevent/limit re	lease from	site						
No specific measures identified.								
Substance release quantities after risk man	agement n	neasures						
Release factor before on-site RMM (Air)		(0.01%					
Release factor after on-site RMM (Air)		(0.01%					
Release factor before on-site RMM (Water)			2E-5%					
Release factor after on-site RMM (Water)			2E-5%					

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Release factor after on-site RMM (soil)

5E-3%

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) TRA Consumers 3.1 (R15)

	Inha	alation	Dermal		0		
Chemical product category [PC]	inhalation exposure (mg/m³)	Risk characterisati on ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Oral exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Combined routes
PC13 (CS2)	78.22	0.832	0.018	< 0.01	0	< 0.01	0.833
PC13 (CS3)	71.94	0.765	0.035	< 0.01	0	< 0.01	0.767
PC13 (CS4)	55.15	0.587	3.57E-3	< 0.01	0	< 0.01	0.587
PC13 (CS5)	63.10	0.671	0.018	< 0.01	0	< 0.01	0.672
PC13 (CS6)	65.11	0.693	7E-4	< 0.01	0	< 0.01	0.693
PC13 (CS7)	93.46	0.994	0.018	< 0.01	0	< 0.01	0.995

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.2E-04	2.3E-06	6.7E-04	1.4E-01	3.7E-04
Risk Characterization Ratio (RCR)	3.4E-01	9.8E-04	2.7E-04	9.8E-02	1.2E-04

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	6.8E-05
Inhalation	7.1E-06	7.1E-06
combined routes	7.5E-05	7.5E-05

4. Evaluation guidance to downstream user							
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for- industries-libraries.html).						
Exposure assessment	Consumer EGRET 2, TRA Consumers 3.1 (R15)						
instrument/tool/method	environmental exposure	PETRORISK v7.04					

Exposure Scenario 17: - Consumer use - Use in Functional

1.0 Contributing Scenarios	
Chemical product category [PC]	PC16 Heat transfer fluids PC17 Hydraulic fluids
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems

2.0 Operational conditions and risk management measures
2.1 Control of worker exposure
Product characteristics

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

Physical form of product	Liquid						
· ·	Chem		ical product		Cotogony	0/	
Concentration of substance in product		cate	gory [PC]		Category	/0	
			PC16		<u>CS2</u>	<= 100	
Human factors not influenced by risk mana	aomont		FUI		633	<= 100	
numun nectors not innucliced by how man	Chem		nical product		Category	Potential exp	osure
Potential exposure area		outo	PC16		CS2	Inside hands	/ one hands
			DC17		CS3	Inside hands	/ one
			PCI/			hand / palm of	hands
		nemical	Categor	v –		Exposure route	
Exposure route	cate	egory [PC]		,	Inhalation	Dermal	Oral
		PC16	CS2		Yes	Yes	No
		PC17	CS3		Yes	Yes	No
	Ch	omical					
Exposed Area (cm ²) / Amounts used (cm ³)	cate	roduct gory [PC]	Categor	у	Inhalation	Dermal Exposed Area	Oral Product
		PC1	CS2		-	<= 468 cm ²	swallowed
		PC4	CS6		-	<= 468 cm ²	-
	C	hemical	Catagor	. –		Transfer factor	
Transfer factor	cate	aorv [PC]		y	Inhalation	Dermal	Oral
		PC16	CS2		1	1	-
		PC17	CS3		1	-	-
Frequency and duration of use		01				— ———————————————————————————————————	
	cate				Category	Exposure du	ration
Exposure duration (hours/Event)			PC16		CS2	0.17	sity
			PC17		CS3	0.17	
	r						
	Chem		tegory [PC]		Category	Use freque	ncy
Frequency of use (event/Day)		Cate	PC16		CS2	1	<u>(v)</u>
			PC17		CS3	1	
	Chem		ical product		Category	Amounts u	sed
Amounts used (g/Event)		Cate	PC16		CS2	<= 2.2E	3
			PC17		CS3	<= 2.2E	3
Operational conditions					1		
Area of use	All PC C	odes			Indoor		
		Chemi	ical product		Category	Room volu (m ³)	ime
Room volume		Cate	PC16		CS2	>= 34	
			PC17		CS3	>= 34	
Risk management measures							
Respiratory protection	Not requ	ired					
Eve Protection	Not requi	ired					
2.2 Control of environmental exposure							
Amounts used							
Annual site tonnage (tons/year):			5E3				
iviaximum dally site tonnage (kg/day):			0.684				
Emission days (days/vear):		<u> </u>	3.7E+02				
Release fraction to air from process (initial rele	ease prior t	0	5%				
RMM):			J /0				
Release fraction to wastewater from process (initial release prior to RMM):			5%				

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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Local release rate (Air) (kg/day)	0.034 kg/day			
Organisational measures to prevent/limit release from site				
No specific measures identified.				
Substance release quantities after risk management measures				
Release factor before on-site RMM (Air)	5%			
Release factor after on-site RMM (Air)	5%			
Release factor before on-site RMM (Water)	5%			
Release factor after on-site RMM (Water)	5%			
Release factor after on-site RMM (soil)	5%			

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

TRA Consumers 3.1 (R15)

	Inha	alation Dermal			0		
Chemical product category [PC]	inhalation exposure (mg/m³)	Risk characterisati on ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Oral exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Combined routes
PC16	0.162	< 0.01	3.12	0.173	0	< 0.01	0.175
PC17	0.162	< 0.01	3.12	0.173	0	< 0.01	0.175

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model) PETRORISK v7.04

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.7E-04	5.0E-06	3.0E-03	1.8E-01	3.9E-03
Risk Characterization Ratio (RCR)	3.6E-01	2.0E-03	7.9E-03	1.2E-01	2.3E-03

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	7.3E-05
Inhalation	7.1E-06	7.1E-06
combined routes	7.5E-05	8.0E-05

4. Evaluation guidance to downstream user						
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for- industries-libraries.html).					
Exposure assessment Consumer		EGRET 2, TRA Consumers 3.1 (R15)				
instrument/tool/method	environmental exposure	PETRORISK v7.04				

Exposure Scenario 18: - Consumer use - Use in lubricants

1.0 Contributing Scenarios	
Chemical product category [PC]	PC24 Lubricants, greases, release products PC31 Polishes and wax blends PC35 Washing and cleaning products (including solvent based products)
Environmental release categories [ERC]	ERC8a Wide dispersive indoor use of processing aids in open systems ERC8d Wide dispersive outdoor use of processing aids in open systems

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

2.0 Operational conditions and risk management measures							
2.1 Control of worker exposure							
Product characteristics							
Physical form of product Li	quid						
	Chemic categ	al product ory [PC]	Category	%			
			CS2	<= 100)		
Concentration of substance in product	F	PC24	CS3	<= 20			
			CS4	<= 50			
	F	PC31	CS5	<= 50			
		001	CS6	<= 50			
Human factors not influenced by rick manage	r F	-C35	037	<= 20			
Human factors not innuenced by risk manage	Chemic	al product	Catawawa	Potential ex	posure		
	categ	ory [PC]	Category	area			
			CS2	Both har	nds		
	F	C24	CS3	Both har	nds		
Potential exposure area			CS4	Inside hands hand / palm o	s / one of hands		
	F	PC31	CS5	Inside hands hand / palm o	s / one If hands		
			CS6	Both har	nds		
	F	PC35	CS7	Inside hands	s / one		
				nand / paim d	rnands		
	Exposure route						
	product	Category			<u> </u>		
	category [PC]	Jan	Inhalation	Dermal	Oral		
		CS2	Yes	Yes	No		
Exposure route	PC24	CS3	No	Yes	No		
		CS4	Yes	Yes	No		
	PC31	CS5	Yes	Yes	No		
	DC25	0.86	Yes	Yes	NO		
	FC35	037	165	165	INU		
	Chemical			<u> </u>	Oral		
	product	Category	Inhalation	Dermal	Product		
	category [PC]			Exposed Area	swallowed		
Exposed Area (cm^2) / Amounts used (cm^3)		CS2	-	<= 857.5 cm ²	-		
	PC24	CS3	-	<= 857.5 cm ²	-		
		CS4	-	<= 428.7 cm ²	-		
	PC31	CS5	-	$<= 430 \text{ cm}^2$	-		
	PC35	CS7	-	$<= 428 \text{ cm}^2$	-		
	1 000	001		420 011			
	Chemical			Transfer factor			
	product	Category	Inhalation	Dermal	Oral		
		CS2	1	1	-		
Transfer factor	PC24	CS3	-	1	-		
		CS4	1	1	-		
	PC31	CS5	1	1	-		
	1 0 3 1	CS6	1	1	-		
	PC35	CS7	1	1	-		
Frequency and duration of use		- I I					
	categ	ory [PC]	Category	Exposure di (hours/Ev	vent)		
			CS2	0.17			
Exposure duration (hours/Event)	F	PC24	CS3	-			
			CS4	0.17			
	F	PC31	<u>CS5</u>	1.23			
		0C35	CS0 CS7	0.33			
	F	000	031	0.17			

Renewable hydrocarbons

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

Date of issue: 20th December 2023 Version: 1.0

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	Chen cat	nical product egory IPC1	Catego	ory	Use frequency (event/Dav)		
Frequency of use (event/Day)		PC24	All		1		
		PC31	All		1		
		PC35	All		1		
					1		
	Chem	nical product			Amounts used		
	cat	egory [PC]	Catego	ory	(g/Event))		
			CS2		<= 2.2E3		
Americante un ed (a/Eurent)		PC24	CS3		<= 34		
Amounts used (g/Event)			CS4		0.17		
		DC24	CS5		<= 142		
		PC31	CS6	1	<= 135		
		PC35	CS7		<= 35		
Operational conditions							
Area of use	All PC Codes			Indoor			
	Chen cat	nical product egory [PC]	Catego	ory	Room volume (m³)		
			CS2		>= 34		
	PC24		CS3		>= 34		
Room volume			CS4	CS4 >= 20			
		D004	CS5		>= 20		
		PC31	CS6		>= 20		
		PC35	CS7		>= 20		
Risk management measures							
Respiratory protection	Not required						
Hand/Skin protection	Not required						
Eye Protection	Not required						
2.2 Control of environmental exposure							
Amounts used							
Annual site tonnage (tons/year):		5E3					
Maximum daily site tonnage (kg/day):		0.685					
Operational conditions		•					
Emission days (days/year):		3.7E+02					
Release fraction to air from process (initial rele	ease prior to	4 50/					
RMM):		1.5%					
Release fraction to wastewater from process (initial release prior	5%					
Local release rate (Air) (kg/day)	0.034 ko/day						
Organisational measures to prevent/limit re	elease from site	0.00+ kg/ddy					
No specific measures identified.							
Substance release quantities after risk mar	nagement measure	s					
Release factor before on-site RMM (Air)	1.5%						
Release factor after on-site RMM (Air)	1.5%						
Release factor before on-site RMM (Water)	5%						
Release factor after on-site RMM (Water)		5%					
Release factor after on-site RMM (soil)		5%					

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model) TRA Consumers 3.1 (R15)

	Inhalation		Dermal		Oral		
Chemical product category [PC]	inhalation exposure (mg/m³)	Risk characterisati on ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Oral exposure (mg/kg bw/day)	Risk characterisati on ratio (RCR)	Combined routes
PC24 (CS2)	0.162	< 0.01	5.72	0.318	0	< 0.01	0.32
PC24 (CS3)	0	< 0.01	1.14	0.063	0	< 0.01	0.063
PC24 (CS4)	0.492	< 0.01	1.43	0.079	0	< 0.01	0.085
PC31 (CS5)	25.73	0.274	7.17	0.398	0	< 0.01	0.672
PC31 (CS6)	1.684	0.018	2.86	0.159	0	< 0.01	0.177
PC35 (CS7)	2.357	0.025	14.27	0.793	0	< 0.01	0.818

Renewable hydrocarbons

Hartree®

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

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3.2 Environmental exposure prediction							
Exposure assessment (method/calculation model) PETRORISK v7.04							
environmental exposure		freshwater		marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)		9.7E-04		5.0E-06	3.0E-03	1.8E-01	3.9E-03
Risk Characterization Ratio (RCR)		3.68	E-01 2.0E-03		7.9E-03	1.2E-01	2.3E-03
Indirect exposure to hu	umans via the environme Exposure route		ment: Exposure estimation (μg/kg/day)		Risk characterisation ratio (RCR)		
	Oral		6.8E-05		7.3E-05		
Inhalatio		tion		7.1E-06	7.1E-06		
	combined routes		7.5E-05		8.0E-05		
4. Evaluation guidance to downstream user							
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-						

Eveneure annont	Consumer	EGRET 2, TRA		
Exposure assessment	Consumer	Consumers 3.1 (R15)		
Instrument/tool/method	environmental exposure	PETRORISK v7.04		