

Renewable hydrocarbons

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

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**

Renewable hydrocarbons **Product Name**

C10-20H22-42 Molecular formula CAS No. 928771-01-1 EC No. 700-571-2

REACH Registration No. 06-2120907698-41-0000

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

Identified use(s)

No.	Exposure Scenario	Page:
1	Formulation or re-packing (Manufacture of substances and	11
	mixtures)	
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) -	30
	High environmental release	
11	Widespread use by professional workers (Use in water	32
	treatment)	
12	Widespread use by professional workers (Use in functional	34
	fluids)	
13	Widespread use by professional workers (Use in functional	36
	fluids)	
14	Widespread use by professional workers (Use in explosive	38
	manufacturing and use)	
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

Uses advised against

Telephone

Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification

HARTREE PARTNERS (UK) LIMITED 2nd Floor, Cardinal Place 100 Victoria Street London

SW1E 5JL United Kingdom +44 (0) 2072017132

Londonops@hartreepartners.com E-mail (competent person)

Only representative of a non-Community manufacturer

Company Identification

Ballindamm 39 20095 Hamburg Germany

Hartree (Germany) GmbH

Telephone +49 (40) 999 993 146

E-mail (competent person) HamburgOps@hartreepartners.com

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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Emergency Phone No. +353 1 809 2566 (Healthcare

Professionals)

+353 1 809 2166 (Members of Public)

24 hours / 7 days
Office hours:

oo 1 000 2100 (Members of 1 abile) -

8am - 10pm, 7 days per week

Language(s) spoken: English

SECTION 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

EINECS No.

Product name Renewable hydrocarbons CAS No. 928771-01-1

Hazard Pictogram(s)



700-571-2

Signal Word(s) DANGER

Hazard Statement(s)

H304: May be fatal if swallowed and enters airways.

Precautionary Statement(s) P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/....

P331: Do NOT induce vomiting.

Supplemental information EUH066: Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards None known

SECTION 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

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.

Inhalation 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.

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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.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention if

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. Seek immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Irritation of the respiratory tract. Repeated exposure may cause skin dryness or cracking. May cause diarrhoea and nausea. May be fatal if swallowed and

Indication of any immediate medical attention and Treat symptomatically.

special treatment needed

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

4.3

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 caut emergency procedures upwi

Caution - spillages may be slippery. Evacuate the area and keep personnel 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 up

Provided it is safe to do so, isolate the source of the leak. Clean up spill 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.

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Incompatible materials

Specific end use(s)

Keep away from: Strong oxidising agents.

See Section: 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

7.3

8.1.1 Occupational exposure limits Not established

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.

Eye/ face protection



Use eye protection according to EN 166, designed to protect against liquid splashes.

Skin protection



Hand protection: Wear impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Body protection: Wear suitable coveralls to prevent exposure to the skin.

Respiratory protection



In case of inadequate ventilation wear respiratory protection. Use NIOSH approved respiratory protection.

Thermal hazards

Not applicable

8.2.3 Environmental exposure controls

Avoid release to the environment. Do not allow to enter drains, sewers or water courses.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

> Physical state Liquid 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

Flash point

Auto-ignition temperature Decomposition temperature

Kinematic viscosity Solubility

Partition coefficient: n-octanol/water (log value)

Vapour pressure

Density and/or relative density Relative vapour density Particle characteristics

9.2 Other information Not established 64 °C at 1013 hPa 204 °C at 1013 hPa Not established 5.3 - 6.32.6 mm²/s at 40 °C 0.075 mg/L at 25 °C Insoluble in water Log KOW = 8.4 at 20 °C 87.1 Pa at 25 °C 0.772 at 20 °C

None known

Not established

Not established

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity Stable under normal conditions 10 2 Chemical stability Stable under normal conditions

10.3 Possibility of hazardous reactions None anticipated. Hazardous polymerisation will not occur.

10.4 Conditions to avoid Avoid high temperatures or direct sunlight. 10.5 Incompatible materials Keep away from: Strong oxidising agents.

Incomplete combustion is likely to give rise to a complex mixture of airborne 10.6 Hazardous decomposition products

solid and liquid particulates and gases, including carbon monoxide and

unidentified organic and inorganic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on hazard classes as defined in

Regulation (EC) No 1272/2008 Acute toxicity - Ingestion

Acute toxicity - Inhalation

Acute toxicity - Skin contact

Skin corrosion/irritation

Serious eye damage/irritation

Respiratory or skin sensitisation

Germ cell mutagenicity

Carcinogenicity

Reproductive toxicity

Based upon the available data, the classification criteria are not met.

LD50 (oral,rat) mg/kg: >2000 (EU Method B.1) (Mullaney, 2005) Based upon the available data, the classification criteria are not met.

LC50 (inhalation,rat) mg/l/4h: 4467 (OECD 403) (Nilsen, Haugen & Zaglsen,

1988)

Based upon the available data, the classification criteria are not met. LD50 (skin,rat) mg/kg: >2000 (EU Method B.3) (Sanders, 2006)

Based upon the available data, the classification criteria are not met. Not irritating to skin (rabbit) (EU Method B.4) (Sanders, 2007)

Based upon the available data, the classification criteria are not met. Reversible effects on the eye (rabbit) (EU Method B.5) (Sanders, 2007)

Based upon the available data, the classification criteria are not met. Sensitisation (guinea pig) – Negative (EU Method B.6) (Richeux, 2008) Based upon the available data, the classification criteria are not met.

Mutagenicity - Negative (bacteria) (EU Method B.13/14) (Thompson, 2005)

Based upon the available data, the classification criteria are not met.

No data available

Based upon the available data, the classification criteria are not met.

Reproductive toxicity: Negative (rat) (OECD 416) (Dhinsa, Brooks & Watson

2009)

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NOAEL = 1000 mg/kg bw/day

Developmental toxicity: Negative (rabbit) (OECD 414) (Hartman-Van Dycke,

2020)

NOAEL = 1000 mg/kg 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 mm²/s at 40 °C

11.2 Information on other hazards

Other information

11.2.2

11.2.1 Endocrine disrupting properties This product does not contain a substance that has endocrine disrupting

properties with respect to humans as no components meets the criteria.

None known

SECTION 12: ECOLOGICAL INFORMATION

12.1	Toxicity	Based upon the available data, the classification criteria are not met.
		LL50 (48 hour): > 1000 mg/L (fish)(OECD 203) (Goodband, 2005)
		NOELR (48 hour): > 1000 mg/L (fish) ((Q)SAR) (CONCAWE, 2006)
12.2	Persistence and degradability	Readily biodegradable.
		% Degradation: 82 (28 days) (OECD 301B) (Clarke, 2008)
12.3	Bioaccumulative potential	The substance has low potential for bioaccumulation.
		BCF = 116.3 (OECD 305A) (Boethling et al., 1997)
12.4	Mobility in soil	The substance has low mobility in soil.
		Koc > 427000 (BCFWIN v2.17) (O' Connor & Woolley, 2009)
12.5	Results of PBT and vPvB assessment	Not classified as PBT or vPvB. None of the substances in this product fulfil the
		criteria for being regarded as a PBT or vPvB substance.
12.6	Endocrine disrupting properties	This product does not contain a substance that has endocrine disrupting
		properties with respect to non-target organisms as no components meets the
		criteria.
12.7	Other adverse effects	None known

SECTION 13: DISPOSAL 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.

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 hazardous substance	Environmentally hazardous substance	Marine Pollutant.	Environmentally hazardous substance
14.6	Special precautions for user	See Section: 2			
14.7	Maritime transport in bulk according to IMO instruments	No information available.	No information available.	No information available.	No information available.
14.8	Additional information	None known			

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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

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 A REACH chemical safety assessment (CS

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: Safepharm Laboratories Ltd., Shardlow Business Park, Shardlow, Derbyshire DE72 2GD UK, Report no: 2106/0028. Owner company; Neste Oil Oyi,
- 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: 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
- 6. Hartman-Van Dycke, K.C.G. 2020: Prenatal Developmental Toxicity Study of Neste Renewable Diesel by Oral Gavage in Rats (study 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
- 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), Pharmacology and Toxicology 62, 259-266.
- 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
- 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
- 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
- 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 Oyj, POB 95, FI-00095, NESTE OIL, Finland, Report date: Aug 28, 2007

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 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)

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NAME Renewable hydrocarbons

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

Summary of Parameters

Physical parameters				
Vapour pressure (hPa)			87.1Pa at 25°C	
Partition Coefficient	t (log K _{ow})		Log Kow (Log Pow): 8.4 at 20°C	
Solubility (Water) (r	ng/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 (DNEL)				
Workers	Long Term - Systemic effects	Inhalation (mg/m³)	147mg/m³	
vvoikeis		Dermal (mg/kg bw/day)	42mg/kg bw/day	
		Inhalation (mg/m³)	94mg/m³	
Consumer	Long Term – Systemic effects	Dermal (mg/kg bw/day)	18mg/kg bw/day	
	ellecis	Oral (mg/kg bw/day)	18mg/kg bw/day	
Environmental Parameters (PNECs)				

Freshwater (mg/L)	0.01mg/L
Marine water (mg/L)	0.01mg/L
Freshwater Sediment (mg/kg Sediment dw)	3810mg/kg Sediment dw
Marine water Sediment (mg/kg Sediment dw)	3.73mg/kg sediment dw
Sewage treatment plant (mg/L)	10mg/L
Soil (mg/kg soil dw)	761mg/kg soil dw
Soli (hig/kg soli dw)	76 mg/kg soli dw

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Exposure scenario 2

Exposure scenario 3

Exposure scenario 4

Exposure scenario 5

Exposure scenario 6

Exposure scenario 7

Exposure scenario 8

Exposure scenario 9

Exposure scenario 10

Exposure scenario 11 Exposure scenario 12

Exposure scenario 13

Exposure scenario 14

Exposure scenario 15 Exposure scenario 16

Exposure scenario 17

Exposure scenario 18

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Use at industrial sites (Use in functional fluids)	22
Use at industrial sites (Use in water treatment)	24
Widespread use by professional workers (Use as a fuel)	26
Widespread use by professional workers – (Use in coatings)	28
Widespread use by professional workers (Use in lubricants) – High environmental release	30
Widespread use by professional workers (Use in water treatment)	32
Widespread use by professional workers (Use in functional fluids)	34
Widespread use by professional workers (Use in functional fluids)	36
Widespread use by professional workers (Use in explosive manufacturing and use)	38
Consumer use – Uses in coatings	40
Consumer use – Use as a fuel	46

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

Consumer use - Use in Functional

Consumer use - Use in lubricants

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

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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 management measures				
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid / Includes: Paste / Sluri	y / 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		

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: Advanced Basic general ventilation (1-3 air changes per hour)	
PROC2, PROC3	Use in closed, continuous process with occasional controlled exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)	
PROC5, PROC8a, PROC8b, PROC9, PROC15	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	human health	
Respiratory protection	Not required	
Hand and/or Skin protection	Not required Not required	
Eye Protection	Not required	
2.2 Control of environmental exposure	•	



Renewable hydrocarbons

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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	discharges, air emissions and releases to soil			
	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.				
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 (%):	10/8 (002)			
Organisational measures to prevent/limit release from site				
Process optimized for efficient use of raw materials.				
Conditions and measures related to municipal sewage treatment plant				
Discharge rate of STP	>= 2E3 m3/day (CS2)			
Degradation effectiveness (%) 94.63% (CS2)				
Substance release quantities after risk management measures				
Release factor after on-site RMM (Air)	0.5% (CS1)			
Therease racion after off-site thinki (All)	0.25% (CS2)			
Release factor after on-site RMM (Water)	5E-4% (CS1)			
, ,	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

	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
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

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	Risk characterisation ratio (RCR)
	(µg/kg/day)	



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

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

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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				
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		

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	Occupational He	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, PROC3	Not required. Oc	Use in closed, continuous process with occasional controlled exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (1-3 air changes per hour)		
PROC8a, PROC8b, PROC15	Advanced	Local exhaust ventilation – Not required. Occupational Health and Safety Management System:		
Risk management measures related	to human health			
Respiratory protection	Not required			
Hand and/or Skin protection	Not required Not required			
Eye Protection	Not required			
2.2 Control of environmental exposu				
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		0.01%		



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Release fraction to wastewater from process (initial release prior to RMM):	1E-3%			
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 airborne	e 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.				
Treat 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 (%):	10/0			
Organisational measures to prevent/limit release from site	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

	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

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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]	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 / S	Suspension			
Concentration of substance in product	All PROC's	100			
Human factors not influenced by risk ma	nagement	·			
Frequency and duration of use					
Exposure duration per day	All PROC's	8hr			
Other operational conditions affecting w	orker exposure	<u>.</u>			
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	Occupational Hea	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	Not required. Occ	Use in closed, continuous process with occasional controlled exposure. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced Basic general ventilation (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 h	uman health			
Respiratory protection	Not required			
Hand and/or Skin protection	Not required 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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Emission days (days/year):	300			
Release fraction to air from process (initial release prior to RMM):	0.6%			
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 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.				
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

	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
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 route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	8.7E-04
Inhalation	7.1E-06	7.5E-05
Dermal	7.5E-05	9.5E-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 4: Use at industrial sites (Use in coatings)

1.0 Contributing Scenarios

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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					
Liquid / Includes: Paste / Slur	ry / Suspension				
All PROC's	100				
nagement	•				
Exposure duration per day All PROC's 8hr					
Other operational conditions affecting worker exposure					
All PROC's	Indoor				
All PROC's	<= 40 °C				
All PROC's	288.8 Pa				
	Liquid / Includes: Paste / Slur All PROC's anagement All PROC's orker exposure All PROC's All PROC's All PROC's	Liquid / Includes: Paste / Slurry / Suspension 100			

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 Hea controls assumed	Occupational Health and Safety Guidelines - Management System: Advanced (industrial) exposure controls assumed		
Technical conditions of use				
PROC1, PROC2, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13,	Advanced		ional Health and Safety Management System:	
PROC15		tilation (1-3 air changes per hou		
PROC7	Advanced.	·	ional Health and Safety Management System: ot less than 3 to 5 air changes per hour).	
Risk management measures related to h		, , , , , , , , , , , , , , , , , , , ,		
Respiratory protection	PROC1, PROC2, P		Not required	
, , ,	PROC7		Yes (APF >= 10)	
	PROC1, PROC2, PROC8b, PROC1	PROC4, PROC5, PROC8a, 3, PROC15	Not required	
Hand and/or Skin protection	PROC 7, PROC10		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):		<= 5E3		
Maximum daily site tonnage (kg/day):		<= 18 500		
Operational conditions				
Emission days (days/year):		300		
Release fraction to air from process (initial release prior to RMM):		98%		



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Release fraction to wastewater from process (initial release prior to RMM):	2E-3%
Local release rate (Air) (kg/day)	1.81E4 kg/day
Local release rate (Water) (kg/day)	0.37 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 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)		
Release factor after on-site RMM (Air)	0.98%	
Release factor before on-site RMM (Water)	2E-3%	
Release factor after on-site RMM (Water)	2E-3%	
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

	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
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
PROC10	90.83	0.618	5.486	0.131	0.749
PROC13	90.83	0.618	13.71	0.326	0.944
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)	1.4E-03	4.9E-05	1.1E-01	3.8E-01	3.8E-02
Risk Characterization Ratio (RCR)	5.4E-01	2.0E-02	1.1E-01	2.2E-01	2.2E-02

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	6.0E-03
Inhalation	7.1E-06	7.1E-02
Combined routes	7.5E-05	7.7E-02

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		

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

1.0 Contributing Scenarios	
Sector of uses SU	SU0 Other
	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
Process category [PROC]	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 / Slur	ry / 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	Exposure duration per day All PROC's 8hr				
Other operational conditions affecting worker exposure					
Area of use	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, PROC9, PROC10,	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Advanced		
PROC13,	Basic general ventilation (1-3 air changes per hou	,	
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.		
Diale management management value of the	Enhanced general ventilation (5-10 air changes po	er nour)	
Risk management measures related to h			
Respiratory protection	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC18	Not required	
	PROC7	Yes (APF >= 10)	



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PROC13, I		PROC4, PROC8a, PROC8b, 8	Not required	
Hand and/or Skin protection	PROC 7, PROC10), PROC17	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 prior to RMM):		0.1%		
Release fraction to wastewater from process (initial release prior to RMM):		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	releases to soil	
Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, g 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		no release to wastewater.		
Organisational measures to prevent/limit r				
Process optimized for efficient use of raw mat				
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

	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	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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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 le	easures/operational conditions are adopted, then users should ensure that risks are vels.
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
	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
Process category [PROC]	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 man	agement measures		
<u> </u>	agement 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 ma	anagement	·	
Frequency and duration of use	-		
Exposure duration per day	All PROC's	8hr	
Other operational conditions affecting w	orker 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.

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



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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 h	uman 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 measur	es to reduce or limit (discharges, air emissions and	d 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 r	no release to wastewater.		
Organisational measures to prevent/limi				
Process optimized for efficient use of raw m	aterials.	·		
Substance release quantities after risk n	nanagement measure	es		
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

	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

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	Risk characterisation ratio (RCR)
	(µg/kg/day)	



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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 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 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

agement measures		
Liquid / Includes: Paste / Slurry	/ / Suspension	
All PROC's	100%	
anagement		
All PROC's	8hr	
vorker exposure	·	
All PROC's	Indoor	
All PROC's	<= 40 °C	
All PROC's	288.8 Pa	
	All PROC's anagement All PROC's vorker exposure All PROC's All PROC's	Liquid / Includes: Paste / Slurry / Suspension 100% All PROC's

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 human health					
Respiratory protection	All PROC's	Not required			
Hand and/or Skin protection	All PROC's	Not required			



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Eye Protection	Not required		
2.2 Control of environmental exposure			
Amounts used			
Regional use tonnage (tons/year):		<= 1.12	
Annual site tonnage (tons/year):		<= 2E4	
Maximum daily site tonnage (kg/day):		<= 3.7	
Operational conditions			
Emission days (days/year):		3.0E+02	
Release fraction to air from process (initial rele RMM):	ease prior to	0.03%	
Release fraction to wastewater from process (to RMM):	initial release prior	40%	
Local release rate (Air) (kg/day)		1.11E-3 kg/day	
Local release rate (Water) (kg/day)		1.48 kg/day	
		discharges, air emissions and releases to soil	
		e VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas	
		tion and/or vapour recovery, adsorption. Upgrade of the system in place or	
	t scrubber and/or ai	r 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 app		no release to wastewater.	
Organisational measures to prevent/limit re			
Process optimized for efficient use of raw mater			
Substance release quantities after risk management measures			
Release factor before on-site RMM (Air)		0.03%	
Release factor after on-site RMM (Air)		0.03%	
Release factor before on-site RMM (Water)		40%	
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

	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
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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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
	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
Process category [PROC]	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
Livilorimental release categories [ERC]	ERC9b Wide dispersive outdoor use of substances in closed systems – CS2-Use as a fuel

2.0 Operational conditions and risk mar	agement measures		
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid / Includes: Paste / Slurr	y / Suspension	
Concentration of substance in product	All PROC's	100%	
Human factors not influenced by risk m	anagement		
Frequency and duration of use			
Exposure duration per day	All PROC's	8hr	
Other operational conditions affecting v	vorker 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)



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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):		<= 3E5		
Maximum daily site tonnage (kg/day):		<= 41		
Operational conditions				
Emission days (days/year):		3.7E+02		
Release fraction to air from process (initial release RMM):		0.5%		
Release fraction to wastewater from process (to RMM):	initial release prior	1E-4%		
Local release rate (Water) (kg/day)		4.11E-5 kg/day	4.11E-5 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 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 orde achieve a reduction of the air emissions.			orption. Upgrade of the system in place or	
Equipment cleaning and maintenance: Not ap	olicable as there is r	no release to wastewater.		
Organisational measures to prevent/limit re				
Process optimized for efficient use of raw mater				
Substance release quantities after risk management measures				
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)		1E-4%		
Release factor after on-site RMM (Water)		1E-4%		
Release factor after on-site RMM (soil)		0.025%		

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

	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
PROC8a	68.12	0.463	13.71	0.326	0.79
PROC8b	90.83	0.618	13.71	0.326	0.944
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)	9.2E-04	2.3E-06	3.6E-06	1.4E-01	3.8E-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	quidance to	downstream	user
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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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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
Environmental release categories [ERC]	PROC19 Hand-mixing with intimate contact and only PPE available 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 man	agement 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 ma	anagement	
Frequency and duration of use		
Exposure duration per day	All PROC's	8hr
Other operational conditions affecting v	vorker 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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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 batch processes. Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)			
PROC3 (CS6), PROC4, PROC5, PROC8b, PROC10 (CS15), PROC11 (CS19),	Local exhaust ven Basic	tilation – Not required. Occupati	onal Health and Safety Management System:	
PROC13, PROC15, PROC19 (CS22)		tilation (1-3 air changes per hou		
PROC8a, PROC10 (CS14), PROC11 (CS18), PROC19 (CS21)	Basic	ventilation (5-10 air changes pe	onal Health and Safety Management System:	
Risk management measures related to hui		, <u> </u>	,	
Respiratory protection	PROC8a, PROC8 PROC15, PROC1		Not required	
	(CS22)	PROC11 (CS19), PROC19	Yes (APF >= 10)	
Hand and/an Chin mastaction		PROC3, PROC4, PROC5, b, PROC10 (CS15), PROC13,	Not required	
Hand and/or Skin protection	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				
		<= 1.37		
Operational conditions				
Operational conditions Emission days (days/year):	ease prior to	3.7E+02		
Operational conditions Emission days (days/year): Release fraction to air from process (initial rel RMM):	<u> </u>			
Operational conditions Emission days (days/year): Release fraction to air from process (initial rel	<u> </u>	3.7E+02		
Operational conditions 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)	(initial release prior	3.7E+02 98% 1% 0.014 kg/day		
Operational conditions 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	(initial release prior	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and	releases to soil	
Operational conditions 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 conditions and and/or air filtration, particle removal and	(initial release prior s to reduce or limit of the centrations of airbornand/or thermal oxidate	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below ion and/or vapour recovery, ads	respective OELs: e.g. thermal wet scrubber, gas	
Operational conditions 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 concremoval and/or air filtration, particle removal additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not applicable of the size of the s	(initial release prior s to reduce or limit of the centrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is r	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	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 conditional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not ap Organisational measures to prevent/limit in	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	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	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 concremoval and/or air filtration, particle removal 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 reprocess optimized for efficient use of raw materials.	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to the company of t	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 concremoval and/or air filtration, particle removal 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 re Process optimized for efficient use of raw material Release factor before on-site RMM (Air)	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to and/or vapour recovery, ads r filtration and/or thermal oxidation release to wastewater.	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 concremoval and/or air filtration, particle removal additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not approached to the process optimized for efficient use of raw material Release factor before on-site RMM (Air) Release factor after on-site RMM (Air)	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	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 release to wastewater. 98% 98%	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 concremoval and/or air filtration, particle removal additional air treatment measures, such as we achieve a reduction of the air emissions. Equipment cleaning and maintenance: Not approach of the companies of the process optimized for efficient use of raw material Release factor before on-site RMM (Air) Release factor before on-site RMM (Water)	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	3.7E+02 98% 1% 0.014 kg/day discharges, air emissions and e VOCs and particulates below to and/or vapour recovery, ads r filtration and/or thermal oxidation release to wastewater. 98% 98% 98% 1%	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	
Operational conditions 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 concremoval 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 approached the control of	(initial release prior to reduce or limit of the tentrations of airbornand/or thermal oxidate the scrubber and/or air oplicable as there is release from site	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 release to wastewater. 98% 98%	respective OELs: e.g. thermal wet scrubber, gas orption. Upgrade of the system in place or	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

	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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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

environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.4E-04	4.3E-06	1.2E-03	1.5E-01	1.6E-03
Risk Characterization Ratio (RCR)	3.5E-01	1.8E-03	3.1E-03	1.1E-01	9.1E-04

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	7.0E-05
Inhalation	7.1E-06	7.1E-06
Combined routes	7.5E-05	7.7E-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.		
Exposure assessment	Workers	TRA Workers 3.0		
instrument/tool/method	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
	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
Process category [PROC]	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 [EBC]	ERC8a Wide dispersive indoor use of processing aids in open systems
Environmental release categories [ERC]	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	Product characteristics				
Physical form of product	Liquid / Includes: Paste / Slurry / Suspension				
Concentration of substance in product All PROC's 100					

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Human factors not influenced by risk management

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Frequency and duration of use	gomont				
Exposure duration per day	All PROC's		8hr		
Other operational conditions affecting work			1 5		
Area of use	PROC1, PROC2, PROC13, PROC1 PROC20	PROC3, PROC8a, PROC8b, 1, PROC17 (CS12) (CS13),	Indoor		
	PROC17 (CS14) (<u>CS15)</u>	Outdoor		
Operating temperature	All PROC's All PROC's		<= 40 °C 288.8 Pa		
Vapour pressure General measures applicable to all activities			200.0 Pd		
using measures such as contained or enclose	d systems, properly rior to breaking conta relevant staff are inf e equipment is avail measures; consider	designed and maintained facilit ainment. Drain down and flush of formed of the nature of exposure able; Clear up spills and dispos	e of waste in accordance with regulatory		
Organisational measures					
All PROC's	Occupational Heal controls assumed	th and Safety Guidelines - Man	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 to 10 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)	Room Ventilation: Enhanced (5 to10 ACH) 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	nan health				
Respiratory protection		PROC3, PROC8a, PROC8b,	Not required		
, ,,,	PROC11, PROC1		Yes (APF >= 10)		
		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			
Maximum daily site tonnage (kg/day): <= 2.74					
Operational conditions Emission days (days/year): 3.7E+02					
Release fraction to air from process (initial release):	ease prior to	3.7E+02 1.5%			
Release fraction to wastewater from process (to RMM):	initial release prior	5%			
Local release rate (Water) (kg/day)		0.137 kg/day			
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil					
Typical measures to maintain workplace conceremoval 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 oxidat t scrubber and/or air	e VOCs and particulates below ion and/or vapour recovery, ads r filtration and/or thermal oxidati	respective OELs: e.g. thermal wet scrubber, gas		
Equipment cleaning and maintenance: Not ap	plicable as there is r	no release to wastewater.			



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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		Derma	ıl	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 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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	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 mana	gement measures			
2.1 Control of worker exposure Product characteristics				
Physical form of product	Liquid / Includes: I	Paste / Slurry / Suspension		
Concentration of substance in product	All PROC's	aste / Siurry / Suspension	100	
Human factors not influenced by risk ma			100	
Frequency and duration of use				
Exposure duration per day	All PROC's		8hr	
Other operational conditions affecting we	orker exposure			
Area of use	All PROC's		Indoor	
Operating temperature	All PROC's		<= 40 °C	
Vapour pressure General measures applicable to all activi	All PROC's		288.8 Pa	
using measures such as contained or enclose Drain down systems and clear transfer lines Where there is potential for exposure: Ensure exposures; Ensure suitable personal protect requirements; monitor effectiveness of contractions of contractions of the contraction of the contrac	sed systems, properly prior to breaking cont re relevant staff are in ive equipment is avail ol measures; conside	designed and maintained facilit ainment. Drain down and flush formed of the nature of exposur lable; Clear up spills and dispos	e of waste in accordance with regulatory	
Avoid contact with skin and eyes. Avoid inhate organisational measures	alation of vapours.			
	Occupational Hea	Ith and Safety Guidelines - Man	agement System: Advanced (industrial) exposure	
All PROC's	controls assumed	initialia carety calacimies inian	agoment eyelem havaneed (mademal) expectate	
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	Basic Enhanced genera	itilation – Not required. Occupat I ventilation (5-10 air changes p	ional Health and Safety Management System: er hour)	
Risk management measures related to he				
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				
Annual site tennage (tens/year):		<= 7E3		
Annual site tonnage (tons/year): Maximum daily site tonnage (kg/day):		<= 7E3 <= 2.98		
Operational conditions		\— Z.30		
Emission days (days/year):		3.7E+02		
Release fraction to air from process (initial reRMM):	elease prior to	1%		
Release fraction to wastewater from process (initial release prior to RMM):		50%		
Local release rate (Water) (kg/day)		1.49 kg/day		
removal and/or air filtration, particle removal additional air treatment measures, such as vachieve a reduction of the air emissions.	ncentrations of airborn and/or thermal oxidat vet scrubber and/or ai	e VOCs and particulates below tion and/or vapour recovery, ads r filtration and/or thermal oxidati	respective OELs: e.g. thermal wet scrubber, gas	
Equipment cleaning and maintenance: Not a		no release to wastewater.		
Organisational measures to prevent/limit				
Process optimized for efficient use of raw m				
Substance release quantities after risk m	anagement measure			
Release factor before on-site RMM (Air)		1%		

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



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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

	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	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

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
	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)
Process category [PROC]	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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Environmental release categories [ERC]

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All PROC's

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2.0 Operational conditions and risk man	agement measures			
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid / Includes: Paste / Slurry / Suspensi	on		
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		

ERC9a Wide dispersive indoor use of substances in closed systems

ERC9b Wide dispersive outdoor use of substances in closed systems

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)

Organisational measures

Vapour pressure

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, PROC9, PROC20	Basic	Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour)		
PROC8a	Basic	itilation – Not required. Occupation I ventilation (5-10 air changes pe	onal Health and Safety Management System: er hour)	
Risk management measures related to	o human 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	e			
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 release prior to RMM):		5%		
Release fraction to wastewater from process (initial release prior to RMM):		5%		
Local release rate (Water) (kg/day)		0.137%		
Technical onsite conditions and meas	sures to reduce or limit (discharges, air emissions and	releases to soil	
Typical measures to maintain workplace	concentrations of airborn	e VOCs and particulates below i	respective OELs: e.g. thermal wet scrubber, gas	
			· · · · · · · · · · · · · · · · · · ·	

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%		

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



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3. Exposure estimation and reference to its source

3.1 Human exposure prediction

	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
PROC9	90.83	0.618	6.86	0.163	0.781
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
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 managed to at least equivalent levels.			
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
	PROC3 Use in closed batch process (synthesis or formulation)
	PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large
Process category [PROC]	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
Environmental release estagaries (EDC)	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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Human factors not influenced by risk management

3. Exposure estimation and reference to its source

Exposure assessment (method/calculation model)

3.1 Human exposure prediction



100

8hr

Renewable hydrocarbons

Concentration of substance in product

Frequency and duration of use

Exposure duration per day

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All PROC's

All PROC's

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Other energianal conditions offerting wer	kor ovnosuro		OII				
Other operational conditions affecting wor			Indoor				
Area of use	All PROC's		Indoor				
Operating temperature	All PROC's		<= 40 °C				
Vapour pressure	All PROC's		288.8 Pa				
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	nal hygiene is impler d systems, properly rior to breaking cont relevant staff are int e equipment is avail measures; consider ation of vapours.	designed and maintained facilitie ainment. Drain down and flush e formed of the nature of exposure lable; Clear up spills and dispose r the need for health surveillance	es and a good standard of general ventilation. quipment where possible prior to maintenance. and aware of basic actions to minimise of waste in accordance with regulatory				
All PROC's	controls assumed		James System Flat and Sa (madelinary expedition				
Technical conditions of use	22 0.0 40041104						
PROC3, PROC8b Local exhaust ventilation – Not required. Occupational Health and Safety Management System: Basic Basic general ventilation (1-3 air changes per hour) Local exhaust ventilation – Not required. Occupational Health and Safety Management System: PROC8a, PROC10 Basic Enhanced general ventilation (5-10 air changes per hour)							
Risk management measures related to hur			· ·· ·/				
Respiratory protection	All PROC's		Not required				
respiratory proteodion	PROC3, PROC8a	PROC8h	Not required				
Hand and/or Skin protection	PROC10	, 1110000	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):		3.7E+02					
Release fraction to air from process (initial rele	ease prior to						
RMM):		95%					
Release fraction to wastewater from process to RMM):	initial release prior	1%					
Local release rate (Water) (kg/day)		0.014 kg/day					
Technical onsite conditions and measures	to reduce or limit		releases to soil				
Typical measures to maintain workplace concremoval and/or air filtration, particle removal additional air treatment measures, such as we achieve a reduction of the air emissions.	entrations of airborn nd/or thermal oxidat et scrubber and/or ai	e VOCs and particulates below r iion and/or vapour recovery, adso r filtration and/or thermal oxidatio	espective OELs: e.g. thermal wet scrubber, gas				
Equipment cleaning and maintenance: Not ap		no release to wastewater.					
Organisational measures to prevent/limit r							
Process optimized for efficient use of raw mat	Process optimized for efficient use of raw materials.						
Substance release quantities after risk ma	nagement measure	es					
Release factor before on-site RMM (Air) 95%							
Release factor after on-site RMM (Air)		95%					
Release factor before on-site RMM (Water)		1%					
Release factor after on-site RMM (Water)		1%					
Release factor after on-site RMM (soil)		4%					

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	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)
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
PROC10	68.12	0.463	5.486	0.131	0.594

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 managed to at least equivalent levels.				
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
	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
Process category [PROC]	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 management measures								
2.1 Control of worker exposure								
Product characteristics			,					
Physical form of product	Physical form of product Liquid / Includes: Paste / Slurry / Suspension							
Concentration of substance in product	All PROC's	100						
Human factors not influenced by risk m	anagement	·						
Frequency and duration of use								
Exposure duration per day All PROC's 8hr								
Other operational conditions affecting v	vorker exposure							

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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 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, PROC5, PROC8b	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	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):		<= 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 release prior to RMM):		0.5%		
Release fraction to wastewater from process (initial release prior to RMM):		5E-4 %		
Local release rate (Water) (kg/day)		1.37E-5 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 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

0.5%
0.5%
5E-4 %
5E-4 %
0.01%

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

	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
PROC5	90.83	0.618	13.71	0.326	0.944

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PROC8a	68.12	0.463	13.71	0.326	0.79
PROC8b	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)	9.2E-04	2.3E-06	6.6E-04	1.4E-01	3.7E-04
Risk Characterization Ratio (RCR)	3.4E-01	9.8E-04	2.6E-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.				
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 PC31 Polishes and wax blends 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 mar	agement mea	sures			
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid PC24 (CS	S28): Paste			
		Chemical product category [PC]	Category	%	
		PC1	CS2	30	
Concentration of substance in product			CS6	<= 1	
		PC4	CS7	<= 10	
			CS8	<= 50	
		PC8	CS9	<= 5	

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			CS10	<= 5		
			CS11	<= 15	5	
			CS12	<= 1.5		
	D(C9a	CS13	<= 28		
	F (
			CS14-CS15	<= 50		
			CS16-CS17	<= 2		
	PC	C9b	CS18	<= 1		
			CS19	<= 6.5	5	
			CS20	<= 50)	
			CS21	<= 28		
	PC	C15 —	0000			
			CS22	<= 2		
			CS23	<= 50		
	PC	C18	CS24	<= 10		
	PC	C23	CS25	<= 50)	
			CS27	<= 100	0	
	PC	C24	CS28	<= 20		
	. ` `	-	CS29	<= 50		
		204				
		C31	CS30-CS31	<= 50		
		234	CS32	<= 10)	
luman factors not influenced by risk manage	ement					
		al product ory [PC]	Category	Potential ex area	=	
			CS2	Fingerti		
			CS3	Both har		
	P	C1 —	CS4	Fingerti		
			CS5	Fingerti	ps	
	PC4		CS6	-		
			CS7	Inside hand hand / palm o		
			CS8	Palm of one		
	PC8					
	<u>P</u>	Co	All	Both har		
			CS12-CS1	Inside hand		
	Pr	C9a		hand / palm o	of hands	
	' '		CS14	-		
			CS15	Both har	nds	
			CS16	Fingerti	DS	
			CS17	Both har		
	D(C9b	CS18	Dotti nai	100	
otential exposure area	F (290	C310	In all de la secol	- /	
·			CS19	Inside hand		
				hand / palm o	of hands	
			CS20	-		
			CS21	Inside hand	s / one	
				hand / palm o		
	P(C15 —	CS22	Inside hand	s / one	
			0022	hand / palm of hands		
		-	Cenn			
		240	CS23	Both har		
	P(C18	CS24			
			CS25	Inside hand		
	PC	C23		hand / palm o	of hands	
			CS26	Both har	nds	
			CS27	Both har		
	PC24 CS28		CS28	Both har		
		J24				
			CS29	Palm of h		
	Dr	C31 —	CS30	Palm of one		
			CS31	Both har	nds	
	PC	C34	CS32	Both har	nds	
		1				
	Chemical			Evnosuro routo		
		Catogory		Exposure route		
	product	Category	Inhalation	Dermal	Oral	
	category [PC]					
		CS2	Yes	Yes	No	
-vnocure route	PC1	CS3	Yes	Yes	No	
Exposure route	1 701	CS4	Vas	Vas	No	

CS4

CS5 CS6

CS7

CS8

Yes

Yes

Yes

Yes

Yes

Yes

Yes

No

Yes

Yes

No

No

No

No

No

PC4

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CS19		, , , , , , , , , , , , , , , , , , , ,	, ,			
CS12		PC8	ΔΙΙ	Vas	Ves	No
PC9a		1 00				
PC98						
CS15 Yes Yes No No No Yes Yes Yes No No Yes Yes Yes No Yes Yes Yes No Yes Yes Yes Yes No Yes Yes Yes No Yes		PC9a				
CS16						
PC9b						
CS18						
C519 NO Yes Yes Yes NO NO Yes		PC0h		No	Yes	No
PC15		1 030		No	Yes	Yes
PC16			CS19	No	Yes	Yes
PC16			CS20	Yes	No	No
PCIS		2012				No
CS23		PC15				
PC18						
PC23		DC19				
PC23						
CS27 Yes Yes No		PC23	0020			
PC24			US26			
CS29						
PC31		PC24				
PC34						
PC34		DC34		Yes	Yes	No
PC34			CS31		Yes	No
Chemical product category PC Category Inhalation Exposed Area Proceedings PC1 CS2 - (= 35.73 cm² - (- 35.75 cm² (- 35.7		PC34	CS32	Yes	Yes	No
Product category PC	<u> </u>	·				
Product category PC						
Proceedings Proceded Proced					I	Oral
CS2			Category	Inhalation		Product
PC1		category [PC]		- Innaration	Exposed Area	swallowed
PC1			CS2	_	<= 35.73 cm ²	-
PC1						
CS5		PC1		-		
PC4		-		-		-
PC4			<u> </u>		<= 35.7 cm ²	
CS8		PC4			-	-
PC8				-		-
PC8				-		-
CS11				-	<= 857.5 cm ²	-
Exposed Area (cm²) / Amounts used (cm³) Exposed Area (cm²) / Amounts used (cm³) Exposed Area (cm²) / Amounts used (cm³) PC9a CS14		PC8		-	<= 857.5 cm ²	-
PC9a			CS11	-	<= 428 cm ²	-
Exposed Area (cm²) / Amounts used (cm³) Exposed Area (cm²) / Cs16				-		-
Exposed Area (cm²) / Amounts used (cm³) Exposed Area (cm²) / Cs16			CS13	-	<= 428.7 cm ²	
Exposed Area (cm²) / Amounts used (cm³) PC9b CS15 CS16 CS17 CS17 CS18 CS18 CS19 CS19 CS20 CS20 CS21 CS22 CS22 CS22 CS23 CS23 CS23 CS23 CS23 CS24 CS24 CS24 CS24 CS24 CS25 CS25 CS25 CS26 CS26 CS27 CS26 CS27 CS27 CS27 CS28 CS27 CS28 CS28 CS28 CS29 CS20 CS27 CS28 CS27 CS28 CS28 CS28 CS29 CS29 CS29 CS29 CS29 CS20 CS20 CS20 CS27 CS27 CS28 CS27 CS28 CS28 CS28 CS29 C		PC9a		_	-	_
CS16	Exposed Area (cm²) / Amounts used (cm³)	T		_	<= 857.5 cm ²	_
PC9b CS17	Exposed Area (citi) / Amounts used (citi)				<= 35.7 cm ²	+
CS18			CC17			-
CS19		PC9b				43
PC15		-				<= 1 cm ³
PC15 CS21					_	<= 1.35 cm ³
CS22				-		-
CS22		PC15		_		-
PC18 CS24 - <= 71.4 cm² - PC23 CS25 - <= 430 cm²				+		-
PC23				-		-
CS26 - <= 857.5 cm² -		PC18		-		-
CS26		DC33		-		-
CS27		FUZS		-	<= 857.5 cm ²	-
PC24 CS28 - <= 857.5 cm² - CS29 - <= 428.7 cm²			CS27	-		-
CS29		PC24		-		-
PC31 CS30 - <= 430 cm² - CS31 - <= 857.5 cm²				-		-
CS31		5001	CS30	-		-
PC34 CS32 - <= 857.5 cm² - Chemical product category [PC] Category Inhalation Dermal Ora		PC31		-		-
Chemical Transfer factor product Category Inhalation Dermal Ora		PC34				_
product Category Inhalation Dermal Ora		1 007	0002	1	_ 007.0 0III	1
product Category Inhalation Dermal Ora	T	Cham's st			Transfer for to	
category [PC] Innalation Dermai Ora			Category		Transfer factor	
			Calegory	Inhalation	Dermal	Oral
representation to PCT 1 All 1 T 1 T 1 T	Transfer factor		AII	4	4	
	Transfer factor	701				
CS6 1		504				
PC4 CS7 1 1 -		PC4	US7	1	1	=
CS8 1 1 1 -						



Renewable hydrocarbons

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	DCO	Λ 11	4	4	
·	PC8	All	1	1	-
		CS12	1	1	-
		CS13	1	1	-
	PC9a				
	. 334	CS14	1	-	-
		CS15	1	1	-
		CS16	1	1	-
	DCOL	CS17	-	1	-
	PC9b	CS18	-	1	1
		CS19	-	1	1
		CS20	1	_	-
		CS21	1	1	-
	PC15				
		CS22	1	1	-
		CS23	1	1	-
	PC18	CS24	1	1	
	PC16	U324			-
	DCCC	CS25	1	1	-
	PC23	CS26	1	1	-
					
		CS27	1	1	-
	PC24	CS28	-	-	1 1
	1	CS29	1	1	-
	PC31	CS30	1	1	-
	PU31	CS31	1	1	-
	DC24				
	PC34	CS32	1	1	-
Frequency and duration of use					
	Chamic	al product		Exposure d	uration
			Category		
	catego	ory [PC]		(hours/Ev	/ent)
			CS2	4	
			CS3	6	
	l P	C1 -			
			CS4	4	
			CS5	1	
				· ·	
			CS6	0.02	
	PC4		CS7	0.17	
			CS8	0.25	
			CS9	0.5	
	l P	C8	CS10	0.33	
	·	-	CS11		
				0.17	
			CS12	2.2	
			CS13	2.2	
	l Pr	00-	0010		
		C9a			
		C9a	CS14	0.3	
		C9a	CS14	0.3	
Evenous duration /house/Event		C9a	CS14 CS15	0.3	
Exposure duration (hours/Event)		C9a	CS14 CS15 CS16	0.3 2 4	
Exposure duration (hours/Event)			CS14 CS15 CS16 CS17	0.3	
Exposure duration (hours/Event)		C9b	CS14 CS15 CS16 CS17	0.3 2 4	
Exposure duration (hours/Event)			CS14 CS15 CS16 CS17 CS18	0.3 2 4 -	
Exposure duration (hours/Event)			CS14 CS15 CS16 CS17 CS18 CS19	0.3 2 4 - -	
Exposure duration (hours/Event)			CS14 CS15 CS16 CS17 CS18	0.3 2 4 -	
Exposure duration (hours/Event)	P(C9b	CS14 CS15 CS16 CS17 CS18 CS19	0.3 2 4 - - - 0.3	
Exposure duration (hours/Event)	P(CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21	0.3 2 4 - - - 0.3 2.2	
Exposure duration (hours/Event)	P(C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22	0.3 2 4 - - - 0.3 2.2 2.2	
Exposure duration (hours/Event)	P(C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23	0.3 2 4 - - - 0.3 2.2 2.2 2.2	
Exposure duration (hours/Event)	P(C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23	0.3 2 4 - - - 0.3 2.2 2.2 2.2	
Exposure duration (hours/Event)	P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24	0.3 2 4	
Exposure duration (hours/Event)	P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25	0.3 2 4	
Exposure duration (hours/Event)	P(C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26	0.3 2 4	
Exposure duration (hours/Event)	P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26	0.3 2 4	
Exposure duration (hours/Event)	P(P(P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27	0.3 2 4	
Exposure duration (hours/Event)	P(P(P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28	0.3 2 4 0.3 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 -	
Exposure duration (hours/Event)	P(P(P(C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29	0.3 2 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29	0.3 2 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30	0.3 2 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31	0.3 2 4	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30	0.3 2 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31	0.3 2 4	
Exposure duration (hours/Event)	P(P	C9b — — — — — — — — — — — — — — — — — — —	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32	0.3 2 4 4 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 0.17 1.23 0.33 1	
Exposure duration (hours/Event)	P(P	C9b ————————————————————————————————————	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 1.23 0.33 1 Use frequ	ency
Exposure duration (hours/Event)	P(P(P(P(P(P(Chemica categor	C9b C15 C18 C23 C24 C31 C34 al product ory [PC]	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CS31 CS32	0.3 2 4 4 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 0.17 1.23 0.33 1	ency
Exposure duration (hours/Event)	P(P(P(P(P(P(Chemica categor	C9b C15 C18 C23 C24 C31 C34 al product ory [PC]	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CS31 CS32	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 1.23 0.33 1 Use frequ	ency
Exposure duration (hours/Event)	P(P(P(P(P(P(P(Chemica catego	C9b C15 C18 C23 C24 C31 C34 al product ory [PC]	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CC32 CS32 CS34 CS27	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23 0.33 1 Use frequ (event/D	ency
	P(P(P(P(P(P(Chemica catego P P(P	C9b C15 C18 C23 C24 C31 C34 al product ory [PC] C1	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CC32 CS31 CS32 CAtegory All All	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 1.23 0.33 1 Use frequ (event/D 1 1	ency
	P(P(P(P(P(P(Chemica catego P P P	C9b C15 C18 C23 C24 C31 C34 al product ory [PC] C1 C4 C8	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CC31 CS32 CS44 CS19 CS21 CS21 CS21 CS21 CS21 CS21 CS21 CS21	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23 0.33 1 Use frequ (event/D	ency
Exposure duration (hours/Event) Frequency of use (event/Day)	P(P(P(P(P(P(Chemica catego P P P	C9b C15 C18 C23 C24 C31 C34 al product ory [PC] C1 C4 C8	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CC31 CS32 CS44 CS19 CS21 CS21 CS21 CS21 CS21 CS21 CS21 CS21	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23 0.33 1 Use frequ (event/D 1 1 1	ency
	P(P(P(P(Category P P P(P(P(Category P P P P(P(Category P P P P P P P P P P P P P P P P P P P	C9b C15 C18 C23 C24 C31 C34 al product ory [PC] C1 C4 C8 C9a	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CCategory All All All All	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 1.23 0.33 1 Use frequ (event/D 1 1 1 1	ency
	P(P	C9b C15 C18 C23 C24 C31 C34 al product bry [PC] C1 C4 C8 C9a C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CCategory All All All All All	0.3 2 4 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23 0.33 1 Use frequ (event/D 1 1 1 1 1	ency
	P(P	C9b C15 C18 C23 C24 C31 C34 al product ory [PC] C1 C4 C9a C9a C9b C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 Category All All All All All All All	0.3 2 4 4 0.3 0.3 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 1.23 0.33 1 Use frequ (event/D 1 1 1 1	ency
	P(P	C9b C15 C18 C23 C24 C31 C34 al product bry [PC] C1 C4 C8 C9a C9b	CS14 CS15 CS16 CS17 CS18 CS19 CS20 CS21 CS22 CS23 CS24 CS25 CS26 CS27 CS28 CS29 CS30 CS31 CS32 CCategory All All All All All	0.3 2 4 4 0.3 2.2 2.2 2.2 2.2 2.2 1.23 0.33 0.17 - 0.17 1.23 0.33 1 Use frequ (event/D 1 1 1 1 1	ency



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	PC18	All	1
	PC23	All	1
	PC24	All	1
	PC31	All	1
	PC34	All	1
		7	· .
	Chemical product		Amounts used
	category [PC]	Category	(g/Event))
	category [r o]	CS2	(g/Eventy) <= 9
		CS3	<= 6.39E3
	PC1	CS3	<= 85.05
		CS5	
			<= 75
		CS6	<= 0.5
	PC4	CS7	<= 2E3
		CS8	<= 4
		CS9	<= 15
	PC8	CS10	<= 27
		CS11	<= 35
	<u> </u>	CS12	<= 2.76E3
	PC9a	CS13	<= 744
	FOSa	CS14	<= 215
		CS15	<= 491
Amounts used (g/Event)		CS16	<= 85
,	D001	CS17	<= 1.38E4
	PC9b	CS18	-
		CS19	-
		CS20	<= 215
		CS21	<= 744
	PC15	CS22	<= 2.76E3
		CS23	<= 491
	PC18	CS24	<= 40
		CS25	<= 56
	PC23	CS26	<= 56
		CS27	<= 30 <= 2.2E3
	PC24	CS27 CS28	<= 2.2E3 <= 34
		CS29	<= 73
	PC31	CS30 CS31	<= 142
		1.0.31	<= 135
	PC34	CS32	<= 115
	PC34	CS32	
Operational conditions Area of use			
-	PC34	CS32	<= 115 Room volume
	All PC Codes Chemical product category [PC]	CS32 Indoor Category	<= 115 Room volume (m³)
	All PC Codes Chemical product category [PC] PC1	CS32 Indoor Category All	<= 115 Room volume
	All PC Codes Chemical product category [PC] PC1 PC4	CS32 Indoor Category	<= 115 Room volume (m³)
	All PC Codes Chemical product category [PC] PC1	CS32 Indoor Category All	<= 115 Room volume (m³) >= 20
	All PC Codes Chemical product category [PC] PC1 PC4	CS32 Indoor Category All All All	<= 115 Room volume (m³) >= 20 >= 34 >= 20
	All PC Codes Chemical product category [PC] PC1 PC4 PC8	CS32 Indoor Category All All All CS12-CS13	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20
	All PC Codes Chemical product category [PC] PC1 PC4	CS32 Indoor Category All All All CS12-CS13 CS14	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 34
-	All PC Codes Chemical product category [PC] PC1 PC4 PC8	CS32 Indoor Category All All All CS12-CS13 CS14 CS15	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20
	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20 >= 34 >= 20 >= 20
Area of use	All PC Codes Chemical product category [PC] PC1 PC4 PC8	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22	<pre>Room volume (m³) >= 20 >= 34 >= 20 >= 34 >= 20 >= 20 >= 34 >= 20 - - - >= 34 >= 20 - - - >= 34 >= 20</pre>
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 34 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9b PC15 PC18	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24	<= 115 Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 34 >= 20 -= 20 >= 34 >= 20 >= 34 >= 20 >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26	Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9b PC15 PC18 PC23	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27	Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20 >= 34 >
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9b PC15 PC18	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28	Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20 >= 34 >= 20 >= 34 >= 34 >= 20 >= 34 >= 34 >= 20 >= 34 == 34 >
	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29	Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24 PC24 PC31	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS29 CS30-CS31	C
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29	Room volume (m³) >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 >= 20 >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 20 >= 20 >= 34 -= >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20 >= 20
Room volume Risk management measures	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24 PC24 PC31	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS29 CS30-CS31	C
Room volume Risk management measures Respiratory protection	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24 PC31 PC34 Not required	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS29 CS30-CS31	C
Area of use	PC34 All PC Codes Chemical product category [PC] PC1 PC4 PC8 PC9a PC9a PC9b PC15 PC18 PC23 PC24 PC31 PC34	CS32 Indoor Category All All All CS12-CS13 CS14 CS15 CS16-CS17 CS18 CS19 CS20 CS21-CS22 CS23 CS24 CS25-CS26 CS27 CS28 CS29 CS29 CS30-CS31	C



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Date of issue: 20th December 2023 Version: 1.0

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 RMM):	98.5%				
Release fraction to wastewater from process (initial release prior to RMM):	1%				
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	De	rmal	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 exposure prediction	
Exposure assessment (method/calculation model)	PETRORISK v7.04



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environmental exposure	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC) (Regional)	9.4E-04	4.3E-06	1.2E-03	1.5E-01	1.6E-03
Risk Characterization Ratio (RCR)	3.5E-01	1.8E-03	3.1E-03	1.1E-01	9.1E-04

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	6.8E-05	7.0E-05
Inhalation	7.1E-06	7.1E-06
combined routes	7.5E-05	7.7E-05

4. Evaluation guidance to downstream user						
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that rare managed to at least equivalent levels. For scaling see 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-findustries-libraries.html).						
Exposure assessment instrument/tool/method	Consumer	EGRET 2, TRA Consumers 3.1 (R15)				
instrument/tool/method	environmental exposure	PETRORISK v7.04				

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

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

2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid		
	Chemical product category [PC]	Category	%
		CS2	<= 10
encentration of substance in product		CS3	<= 10
	PC13	CS4	<= 5
	PCIS	CS5	<= 10
		CS6	<= 2
		CS7	<= 10
Human factors not influenced by risk m	nagement		
	Chemical product category [PC]	Category	Potential exposure area
		CS2	Palm of one hand
		CS3	Palm of one hand
Potential exposure area		CS4	Inside hands / one
•	PC13		hand / palm of hands
		CS5	Palm of one hand
		CS6	Palm of one hand
	1 1	CS7	Palm of one hand



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	р	nemical roduct gory [PC]			Inhalation	Dermal	Oral
	Outo	gory [r o]	CS2		Yes	Yes	No
			CS3		Yes	Yes	No
		D040	CS4		Yes	Yes	No
		PC13	CS5		Yes	Yes	No
			CS6		Yes	Yes	No
			CS7		Yes	Yes	No
	1			1			<u> </u>
	Cl	hemical				Transfer factor	
	р	roduct	Category		lub alatian		0
	cate	gory [PC]			Inhalation	Dermal	Oral
			CS2		2E-3	5E-3	-
Transfer factor			CS3		0.01	0.01	-
		PC13	CS4		0.03	1E-3	-
		1 013	CS5		0.05	5E-3	-
			CS6		0.02	1E-3	-
			CS7		2E-3	5E-3	-
Frequency and duration of use							
			cal product gory [PC]		Category	Exposure di (hours/Ev	
			<u></u>		CS2	0.05	
Exposure duration (hours/Event)			<u></u>		CS3	0.017	
Exposure duration (nodis/Event)			PC13		CS4	0.033	
		'			CS5	0.017	
			_		CS6	0.033	
					CS7	0.513	
	1						
			cal product		Category	Use frequ	
Frequency of use (event/Day)			gory [PC]		(eve		ay)
			PC13		All	1	
	1						
		Chemical product			Category	Amounts	
		cate	gory [PC]			(g/Even	
			_		CS2	<= 4.4E	
Amounts used (g/Event)			_		CS3	<= 7.5E	
(9, = 1 - 11, 1)		1	PC13		CS4	<= 750	
			_	CS5		<= 255	
					CS6	<= 3.32	
					CS7	<= 3.2E	:5
Operational conditions	1						
Area of use	PC13 (CS	S2) (CS3) ((CS7)	Outdoor			
	PC13 (CS	S4) (CS5) ((CS6) Indoor				
Risk management measures	<u> </u>	, , , ,	. ,				
Respiratory protection	Not requir	red					
Hand/Skin protection	Not requir						
Eye Protection	Not requir						
2.2 Control of environmental exposure							
Amounts used							
Annual site tonnage (tons/year):			1E6				
Maximum daily site tonnage (kg/day):			14				
Operational conditions							
Emission days (days/year):			3.7E+02				
Release fraction to air from process (initial rel	ease prior to	0	0.01%			<u> </u>	<u> </u>
RMM):							
Release fraction to wastewater from process (initial release prior to RMM):			2E-5%				
Local release rate (Water) (kg/day)			2.74E-6 kg/day				
Organisational measures to prevent/limit r	elease fron						
No specific measures identified.							
Substance release quantities after risk ma	nagement i	measures					
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%				
Telease factor after off-site retivity (water)							



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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		Oı		
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)

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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 o	4. Evaluation guidance to downstream user						
For scaling see	are managed to at least equivalent Available hazard data do not supp	easures/Operational Conditions are adopted, then users should ensure that risks at levels. Fort the need for a DNEL to be established for other health effects. Fortitrol technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-					
Exposure assessment instrument/tool/method	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



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Physical form of product	Liquid				
Concentration of substance in product	Chemica	nl product ory [PC]	Category	%	
Concentration of Substance in product		C16	CS2	<= 100	
		C17	CS3	<= 100	
Human factors not influenced by risk manag					
		ory [PC]	Category	Potential exp area	
Potential exposure area	PC	C16	CS2	Inside hands hand / palm of	hands
	PC	C17	CS3	Inside hands hand / palm o	,
	Chemical			Exposure route	
Exposure route	product category [PC]	Category	Inhalation	Dermal	Oral
Exposure route	PC16	CS2	Yes	Yes	No
	PC17	CS3	Yes	Yes	No
_					
Exposed Area (cm²) / Amounts used (cm³)	Chemical product category [PC]	Category	Inhalation	Dermal Exposed Area	Oral Product swallowed
	PC1	CS2	-	<= 468 cm ²	- Swalloweu
	PC4	CS6	-	<= 468 cm ²	-
				•	
	Chemical			Transfer factor	
Transfer factor	product category [PC]	Category	Inhalation	Dermal	Oral
	PC16	CS2	1	1	-
Francisco and direction of use	PC17	CS3	1	-	-
Frequency and duration of use	Chemical product category [PC]		Category	Exposure du (hours/Ev	
Exposure duration (hours/Event)	PC	C16	CS2	0.17	•
	PC	C17	CS3	0.17	
	Chamica	Il product		Use freque	nev
- (() () () () () () () () ()		ory [PC]	Category	(event/Da	
Frequency of use (event/Day)	PC	C16	CS2	1	
	PC	C17	CS3	1	
				1	. 1
		ory [PC]	Category	Amounts u	
Amounts used (g/Event)		C16	CS2	<= 2.2E	
		C17	CS3	<= 2.2E	
Operational conditions					
Area of use	All PC Codes		Indoor		
		l product	Category	Room volu	ıme
Room volume		ory [PC] C16	CS2	(m³) >= 34	
		C17	CS3	>= 34 >= 34	
Risk management measures				7 – 0 –	
Respiratory protection	Not required				
Hand/Skin protection	Not required	<u> </u>			
	Not required				
2.2 Control of environmental exposure					
Amounts used Annual site tonnage (tons/year):	l El	E3			
Maximum daily site tonnage (kg/day):		<u>-3</u> .684			
Operational conditions					
Emission days (days/year):		7E+02			
Release fraction to air from process (initial relear RMM):	. 5.	%			
Release fraction to wastewater from process (in to RMM):	itial release prior 5	%			



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Local release rate (Air) (kg/day)	0.034 kg/day
Organisational measures to prevent/limit release fro	om site
No specific measures identified.	
Substance release quantities after risk management	t 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 instrument/tool/method	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

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2.0 Operational conditions and risk manage	ment measures				
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid				
·	Chemica	al product	Cotomony	%	
	catego	ory [PC]	Category	76	
			CS2	<= 100	
Concentration of substance in product	PC	C24	CS3	<= 20	
			CS4	<= 50	
	PC	C31 —	CS5	<= 50	
			CS6	<= 50	
		C35	CS7	<= 20	
Human factors not influenced by risk manag					
		al product	Category	Potential ex	posure
	catego	ory [PC]		area	
			CS2	Both har	
	PC	C24 —	CS3	Both har	
	, ,) <u></u>	CS4	Inside hands	
Potential exposure area				hand / palm o	
			CS5	Inside hands	
	PC	C31		hand / palm o	
		205	CS6	Both har	
	PC	C35	CS7	Inside hands	
				hand / palm o	r nands
	Chemical product	Category	Inhalation	Exposure route Dermal	Oral
	category [PC]				
		CS2	Yes	Yes	No
Exposure route	PC24	CS3	No	Yes	No
		CS4	Yes	Yes	No
	PC31	CS5	Yes	Yes	No
		CS6	Yes	Yes	No
	PC35	CS7	Yes	Yes	No
	Chemical				
	product category [PC]	Category	Inhalation	Dermal Exposed Area	Oral Product swallowed
		CS2	-	<= 857.5 cm ²	-
Exposed Area (cm²) / Amounts used (cm³)	PC24	CS3	_	<= 857.5 cm ²	_
		CS4	-	<= 428.7 cm ²	-
	2004	CS5	-	<= 430 cm ²	-
	PC31	CS6	-	<= 857.5 cm ²	-
	PC35	CS7	-	<= 428 cm ²	-
1	<u> </u>		•	•	•
	Chemical			Transfer factor	
	product category [PC]	Category	Inhalation	Dermal	Oral
		CS2	1	1	ı
Fransfer factor	PC24	CS3	-	1	=
		CS4	1	1	=
	PC31	CS5	1	1	=
		CS6	1	1	-
	PC35	CS7	1	1	-
requency and duration of use					
		al product ory [PC]	Category	Exposure du (hours/Ev	
			CS2	0.17	
	PC	C24	CS3	-	
		 		0.47	
Exposure duration (hours/Event)			CS4	0.17	J
Exposure duration (hours/Event)		201	CS4 CS5	0.17 1.23	
Exposure duration (hours/Event)	PC	C31 —	CS4 CS5 CS6	1.23 0.33	



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		nical product tegory [PC]	Category	Use frequency (event/Day)	
Frequency of use (event/Day)		PC24	All	1	
, , , , , , , , , , , , , , , , , , , ,		PC31	All	1	
		PC35	All	1	
		L			
		nical product tegory [PC]	Category	Amounts used (q/Event))	
		<u> </u>	CS2	<= 2.2E3	
		PC24	CS3	<= 34	
Amounts used (g/Event)			CS4	0.17	
			CS5	<= 142	
		PC31	CS6	<= 135	
		PC35	CS7	<= 35	
Operational conditions		. 000		1 90	
Area of use	All PC Codes		Indoor		
7.1104 01 400		mical product	mador	Deem velums	
		nical product tegory [PC]	Category	Room volume (m³)	
			CS2	>= 34	
Room volume		PC24	CS3 CS4	>= 34	
Noom volume				>= 20	
	PC31		CS5	>= 20	
			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 RMM):	release prior to	1.5%			
Release fraction to wastewater from process (initial release prior to RMM):		5%			
Local release rate (Air) (kg/day)	0.034 kg/day				
Organisational measures to prevent/limi	1 3.00 i ngrady				
No specific measures identified.					
Substance release quantities after risk n	nanagement measure	25			
Release factor before on-site RMM (Air)	ianagoment measure	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%			
Neicase factor after off-site Nivily (SOII)		J /0			

3. Exposure estimation and reference to its source

3.1	Human	exposure	prediction
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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
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



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3.2 Environmental exposure predictionExposure assessment (method/calculation model)

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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	3.6E-01	2.0E-03	7.9E-03	1.2E-01	2.3E-03

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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	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 instrument/tool/method	Consumer	EGRET 2, TRA Consumers 3.1 (R15)
	environmental exposure	PETRORISK v7.04

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