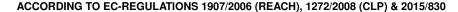
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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product Name Gas oils (petroleum), heavy vacuum

Product Description V2007a-HIGH SULPHUR VGO -GENERIC-Gas Oils (petroleum), heavy

vacuum

Trade Name HIGH SULPHUR VGO - GENERIC

 Product code
 HSVGO

 CAS No.
 64741-57-7

 EC No.
 265-058-3

REACH Registration No. -

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

Identified Use(s)

No.Exposure ScenarioPage:1Distribution of Gas oils (petroleum), heavy vacuum112Formulation and (re)packing of Gas oils (petroleum), heavy vacuum153Use as a fuel (Industrial)194Use as a fuel (Professional)22

Uses Advised Against Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification Vitol SA

Place des Bergues 3 P.O. Box 2056 1211 Geneva 1 Switzerland

 Telephone
 +31 10 498 7200

 Fax
 +31 10 452 9545

 E-Mail (competent person)
 xrea ch@vitol.com

1.4 Emergency telephone number

Emergency Phone No. +44 (0) 1235 239 670, 24/7
Languages spoken All official European languages.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation (EC) No. 1272/2008 (CLP) Asp. Tox. 1; H304

Acute Tox. 4; H332 Carc. 1B; H350 Repr. 2; H361d

STOT RE 2; H373 (Thymus, Liver, blood effects)

Aquatic Acute 1; H400 Aquatic Chronic 1; H410

2.2 Label elements According to Regulation (EC) No. 1272/2008 (CLP)

Product Name V2007a-HIGH SULPHUR VGO - GENERIC-Gas Oils (petroleum), heavy

vacuum

Hazard Pictogram(s)







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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



Signal Word(s) Danger

Hazard Statement(s)

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled. H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to organs through prolonged or repeated exposure:

Thymus, Liver, blood effects

H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s) P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. P281: Use personal protective equipment as required.

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or

doctor/physician.

P331: Do NOT induce vomiting. P273: Avoid release to the environment.

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

2.3 Other hazards May form explosive mixture with air. The vapour is heavier than air; beware of

pits and confined spaces. May cause irritation to eyes and air passages.

Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local

circumstances.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

SUBSTANCE	CAS No.	EC No.	REACH Registration No.	%W/W
Gas oils (petroleum), heavy vacuum	64741-57-7	265-058-3	-	100

SECTION 4: FIRST AID MEASURES



4.1 Description of first aid measures

H2S Warning:

Inhalation

Self-protection of the first aider

The vapour is heavier than air; beware of pits and confined spaces. If it is

suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Avoid all contact. Do not

ingest. If swallowed then seek immediate medical assistance.

Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks

and reach potentially hazardous concentrations.

If there is any suspicion of inhalation: A self contained breathing apparatus

should be worn. Remove to fresh air immediately.

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in

a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. If symptoms persist, obtain

medical attention.

Skin Contact IF ON SKIN (or hair): Remove contaminated clothing immediately and drench

affected skin with plenty of water, then wash with soap and water. If irritation

 $(redness,\,rash,\,blistering)\;develops,\,get\;medical\;attention.$

Eye Contact IF IN EYES: Rinse cautiously with water for several minutes. Remove contact

lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get

medical advice/attention.

Ingestion IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the

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4.2 Most important symptoms and effects, both acute

lungs. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs. If unconscious, place in recovery position and get medical attention immediately. Do not give anything by mouth to an unconscious person. Get medical attention immediately. Do not wait for symptoms to appear. Inhalation: Vapour may be irritant to the respiratory tract.

Skin Contact: Repeated and/or prolonged skin contact may cause irritation.

Eye Contact: May cause eye irritation.

the label where possible).

Ingestion: Aspiration hazard. Aspiration into the lungs may cause chemical

pneumonitis, which can be fatal.

If breathing is laboured, oxygen should be administered by qualified personnel.

In case of accident or if you feel unwell, seek medical advice immediately (show

IF INHALED: If unconscious, place in recovery position and get medical attention immediately. Administer oxygen if available and artificial respiration if necessary.

IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If aspiration is suspected obtain immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs.

and delayed

Indication of any immediate medical attention and

Notes to a physician:

special treatment needed

4.3

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing media
Unsuitable extinguishing media

5.2 Special hazards arising from the substance or mixture

5.3 Advice for fire-fighters

Foam, Carbon dioxide, Water fog or dry powder.

Do not use water jet. Direct water jet may spread the fire.

Not flammable but will support combustion. The vapour is heavier than air; beware of pits and confined spaces. Will float and can be reignited on surface water. Decomposes in a fire giving off toxic fumes: A mixture of solid and liquid particulates and gases including unidentified organic and inorganic compounds. If sulphur compounds are present in appreciable amounts, combustion products may include also H2S and SOx (sulfur oxides) or sulfuric acid

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 release to the environment. Dike fire control water for later disposal.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

H2S Warning:

Small spillages: Large spillages:

6.2 Environmental precautions

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6.3 Methods and material for containment and cleaning up

Caution - spillages may be slippery. Ensure operatives are trained to minimise exposures. Ensure suitable personal protection during removal of spillages. Eliminate sources of ignition. Shut off leaks if without risk. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid all contact with substance. Ensure adequate ventilation. Do not breathe vapour. Do not ingest. If swallowed then seek immediate medical assistance. Do not use sparking tools.

Product may release Hydrogen Sulphide. Exposure controls - These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training. Please see section 8 for appropriate personal protection equipment

Wear flame-resistant antistatic protective clothing.

Evacuate the area and keep personnel upwind. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. Avoid all contact. Wear chemical protection suit and breathing apparatus. See Also Section: 8.

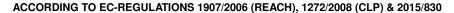
Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. If necessary: Dike area to contain the spill and prevent releases to sewers, drains, or other waterways.

Provided it is safe to do so, isolate the source of the leak. The vapour is heavier than air; beware of pits and confined spaces. Ensure that the equipment is

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Spillages onto land:





adequately grounded. Allow small spillages to evaporate provided there is adequate ventilation.

In case of soil contamination, remove contaminated soil and treat in accordance with local regulations. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a lidded container for disposal or recovery. Dispose of this material and its container as hazardous waste.

Small spillages: Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing.

Large spillages: Cover spillage with foam to reduce evaporation. Do not use water jet.

Collect as much as possible in clean container for reuse or disposal.

Small spillages: Contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents.

Large spillages: Open waters should be contained with floating barriers or other mechanical means and recovered, only if this is strictly necessary and if fire/explosion risks can be adequately prevented. Otherwise control the spreading of the spillage, and let the substance evaporate naturally.

See Section: 8,13

6.4 Reference to other sections

Spillages on water or at sea:

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

H2S Warning:

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature Storage measures Incompatible materials **Specific end use(s)** Obtain special instructions before use. Keep away from sources of ignition - No smoking. Use only outdoors or in a well-ventilated area. Prevent vapour build up by providing adequate ventilation during and after use. Take action to prevent static discharges. Use non-sparking tools. All parts of the plant and equipment should be electrically bonded together and connected to earth. Electrical continuity should be checked at regular intervals. Antistatic clothing and footwear should be used. The vapour is heavier than air; beware of pits and confined spaces. Avoid all contact with substance. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe vapour. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned.

Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances. These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training.

Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Bund storage facilities to prevent soil and water pollution in the event of spillage. Keep only in original packaging. Keep containers properly sealed when not in use. Protect from sunlight. Containers of this material may be hazardous when empty since they retain product residue. Empty container may contain product residue which may result in flammable or explosive vapours inside the container.

Stable at ambient temperatures. Keep only in original packaging. Keep away from oxidising agents.

See Section: 1.2 and/or Exposure Scenario.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

7.3

8.1.1 Occupational Exposure Limits

No Occupational Exposure Limit assigned. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

8.1.2 Biological limit value

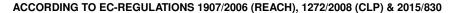
Not established.

8.1.3 PNECs and DNELs

DNEL: Not established.

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PNEC: Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Store in a cool/low-temperature, well-ventilated (dry) place away from heat and ignition sources. Guarantee that the eye flushing systems and safety showers are located close to the working place.

8.2.2 Individual protection measures, such as personal protective equipment (PPE)

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.

Fuels are typically used, transferred and transported in closed systems. If exposure is likely (i.e. during sampling) the following advice may be appropriate. Keep good industrial hygiene. Always wash hands before smoking, eating and drinking. Do not eat, drink or smoke at the work place.

Refer to annexes for exposure scenarios detailing use specific exposure controls

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.

Recommended: Nitrile rubber.

Body protection: Wear anti-static clothing and shoes.

small scale: Wear suitable coveralls to prevent exposure to the skin.

large scale: Chemical protection suit.

Respiratory protection



Thermal hazards

When the product is heated /In case of inadequate ventilation wear respiratory protection. The use of a high efficiency filter (EN143) is recommended. Filter type A2

Closed system(s): Not normally required.

Not applicable.

8.2.3 Environmental Exposure Controls Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance Odour Odour threshold

al I

рΗ

Melting point/freezing point

Initial boiling point and boiling range

Flash point Evaporation rate Flammability (solid, gas) Liquid (May be coloured)
Characteristic
Not established.
Not established.
< 30 °C @ 101 kPa
350 – 600 °C
> 75 °C
Not established.
Not applicable - Liquid

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Upper/lower flammability or explosive limits Not established. Vapour pressure > 0.5 kPa @ 20°C

Vapour density

Relative density $0.80-0.99 \text{ g/cm}^3 \text{ @ } 15 \text{ °C}$ Solubility(ies) Slightly soluble: 0.4 mg/l @ 20 °C

Partition coefficient: n-octanol/water 2.7-6
Auto-ignition temperature > 337 °C
Decomposition Temperature Not established.

Viscosity 7 – 20.5 mm²/s @ 40 °C (<60 mm²/s @ 100 °C)

Explosive properties Not explosive. (Vapour may create explosive atmosphere.)

> 1

Oxidising properties Not oxidising.

9.2 Other information None known.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity Stable under normal conditions. Reacts with - Strong oxidising agents

10.2 Chemical stability Stable under normal conditions. Hazardous polymerisation will not occur.

Product may release Hydrogen Sulphide.

10.3 Possibility of hazardous reactions Vapours are heavier than air and may travel considerable distances to a source

of ignition and flashback. Product may release Hydrogen Sulphide.

10.4 Conditions to avoid Elevated temperature: > 50 °C

Keep away from heat, sources of ignition and direct sunlight. Keep away from oxidising agents. Strong Acids and Alkalis.

10.5 Incompatible materials Keep away from oxidising agents. Strong Acids and Alkalis.

10.6 Hazardous decomposition product(s)

A mixture of solid and liquid particulates and gases including unidentified

organic and inorganic compounds. Decomposes in a fire giving off toxic fumes:

COx, H2S, SOx,

SECTION 11: TOXICOLOGICAL INFORMATION

Carcinogenicity

11.1 Information on toxicological effects

All test data taken from existing ECHA registrations for the substances

mentioned.

Acute toxicity - Ingestion Based upon the available data, the classification criteria are not met.

LD50 (oral,rat) mg/kg: >2000 (OECD 401)

Acute toxicity - Inhalation Acute Tox. 4; Harmful if inhaled.

LC50 (inhalation,rat) mg/l/4h: 4.1 (EPA OTS 798.1150)

Acute toxicity - Skin Contact Based upon the available data, the classification criteria are not met.

LD50 (skin,rabbit) mg/kg: >2000 (OECD 434)

Skin corrosion/irritation Based upon the available data, the classification criteria are not met.

Not irritating to skin. (rabbit) (OECD 404)

EUH066: Repeated exposure may cause skin dryness or cracking. (rat) (OECD

410)

Serious eye damage/irritationBased upon the available data, the classification criteria are not met.

Not irritating to eyes. (rabbit) (EU Method B.5)

Respiratory or skin sensitizationBased upon the available data, the classification criteria are not met.

Sensitisation (guinea pig) - Negative (OECD 406)

Germ cell mutagenicityBased upon the available data, the classification criteria are not met.

ECHA Registration Endpoint summary:

Not classified. Studies showed no consistent evidence of mutagenic activity.

Carc. 1B; May cause cancer.

ECHA Registration Endpoint summary:

Positive (mouse)

Reproductive toxicity Repr. 2; H361d: Suspected of damaging the unborn child.

ECHA Registration Endpoint summary: Reproductive toxicity: Negative

STOT - single exposure Based upon the available data, the classification criteria are not met.

Weight of evidence approach

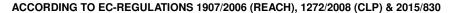
Developmental toxicity: Positive

STOT - repeated exposure STOT RE 2; May cause damage to organs through prolonged or repeated

exposure.

Oral: No data Inhalation: No data

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Dermal: NOAEL 1.06 mg/kg bw/day (rat) (OECD 410)

Aspiration hazard Asp. Tox. 1; May be fatal if swallowed and enters airways.

Viscosity: 7 - 20.5 mm²/s @ 40 °C (<60 mm²/s @ 100 °C)

11.2 Other information None.

SECTION 12: ECOLOGICAL INFORMATION

12.1 **Toxicity** Aquatic Acute 1; Very toxic to aquatic life.

Aquatic Chronic 1; Very toxic to aquatic life with long lasting effects.

Short Term (acute): EL50 48hr (Daphnia magna) 0.22 mg/l (OECD 202)

Long Term (Chronic): The aquatic toxicity was estimated using the PETROTOX computer model.

Estimated: 0.1 mg/l (Fish)

12.2 Persistence and degradability Substance is complex UVCB. Standard tests for this endpoint are intended for

single substances and are not appropriate for this complex substance.

12.3 Bioaccumulative potential Substance is complex UVCB. Standard tests for this endpoint are intended for

single substances and are not appropriate for this complex substance.

Mobility in soil Substance is complex UVCB. Standard tests for this endpoint are intended for 12.4

single substances and are not appropriate for this complex substance.

12.5 Results of PBT and vPvB assessment Not classified as PBT or vPvB.

12.6 Other adverse effects None known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty. Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. Waste code: Fuel Oil (13 07 01)

IMDG/ADN

SECTION 14: TRANSPORT INFORMATION

		AUN/NIU	IIVIDG/ADN
14.1	UN number	UN 3082	UN 3082
14.2	Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, HEAVY HEATING OIL	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, HEAVY HEATING OIL
14.3	Transport hazard class(es)	3	3+(N1, CMR, F)
14.4	Packing group	III	III
14.5	Environmental hazards	MILIEUGEVAARLIJK / ENVIRONMENTALLY HAZARDOUS/ UMWELTGEFÄHREND /DANGEREUX POUR/ L'ENVIRONNEMENT	
14.6	Special precautions for user	See Section: 2	
14.7	Transport in bulk according to Annex II of MARPOL	This product is being carried under th	ne scope of MARPOL Annex 1. Special
	73/78 and the IBC Code	Precautions: Refer to Chapter 7 'Handling and Storage' for special precautio which a user needs to be aware of, or needs to comply with, in connection w transport.	
14.8	Additional Information	ADR HIN: 90	EmS: F-A, S-F
		Tunnel Restriction Code: 3 E Limited Quantity: 5L	Limited Quantity: 5L

ADR/RID

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental

> regulations/legislation specific for the substance or mixture

EU regulations

15.1.1 Annex XVII (Restrictions) Authorisations and/or Restrictions On Use

In accordance with REACH Annex XVII entry 30 (c) this substance is exempt from Entry 28 and 29 of REACH Annex XVII as it is to be sold as a fuel in a

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closed system.

Upper Tier: 25000 tonnes Lower Tier: 2500 tonnes

None

15.1.2 National regulations

Seveso

15.2 Chemical Safety Assessment

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

Sections indicated with the following have been revised

Header and Section 1.3

Updated version and date. Please review SDS with care.

References:

Existing ECHA registration(s) for Gas oils (petroleum), heavy vacuum (CAS No. 64741-57-7) and Chemical Safety Report.

This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830.

LEGEND

LTEL Long Term Exposure Limit
STEL Short Term Exposure Limit
DNEL Derived No Effect Level

PNEC Predicted No Effect Concentration

PBT PBT: Persistent, Bioaccumulative and Toxic vPvB very Persistent and very Bioaccumulative

OECD Organisation for Economic Cooperation and Development

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.

Disclaimers

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Annex to the extended Safety Data Sheet (eSDS)

See below -

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Gas oils (petroleum), heavy vacuum

CAS No. 64741-57-7 EINECS No. 265-058-3

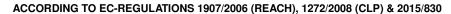
Summary of Parameters

Physical parameters				
Vapour pressure (kPa)			0.02 - 0.791 kPa @ 120°C	
Partition Coefficient (log K _{OW})			Individual components vary between 2.92 and 20.43	
Aqueous solubility (mo	g/l)		Individual components vary between 2.7E-12 and 2.0E+02 Value used for environmental exposure assessment= 0.13	
Molecular weight			Not applicable	
Biodegradability			Not defined	
Human Health (DNEL)				
	Short term	Inhalation (mg/m³)	4700	
Workers	Short term	Dermal (mg/kg bw/day)	Not defined	
Workers	Long Term	Inhalation (mg/m³)	0.18	
	Long Tellin	Dermal (mg/kg bw/day)	0.065	
Inhalation (mg/m³)		Inhalation (mg/m³)	Not defined	
Consumer		Dermal (mg/kg bw/day)	Not defined	
		Oral (mg/kg bw/day)	0.015	

Environmental Parameters (PNECs)

Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

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Number	Title	Page:
Exposure scenario 1	Distribution of Gas oils (petroleum), heavy vacuum	11
Exposure scenario 2	Formulation and (re)packing of Gas oils (petroleum), heavy vacuum	15
Exposure scenario 3	Use as a fuel (Industrial)	19
Exposure scenario 4	Use as a fuel (Professional)	22

Contributing Scenarios

PROC Codes

PROC1 Use in closed process, no likelihood of exposure

PROC2 Use in closed, continuous process with occasional controlled exposure

(Storage) Use in closed, continuous process with occasional controlled exposure, bulk Storage

(Fuel filtering) In-line filter or centrifuge

PROC3 Use in closed batch process (synthesis or formulation)

PROC8a (manual) Manual transfer/pouring from containers

(maintenance) Clean down and maintenance of vessels and containers.

PROC8b (bulk) Bulk transfers (closed systems).

(marine) Marine vessel or barge loading.

(road and rail) Road tanker/rail car loading.

(Drum) Drum/batch transfers.

(refuelling) Refueling residences, heavy equipment.

PROC15 Use as laboratory reagent

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

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Exposure Scenario 1 -Distribution of Gas oils (petroleum), heavy vacuum

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
	PROC1
	PROC2
	PROC2 (Storage)
	PROC2 (Sampling)
Process category [PROC]	PROC3
	PROC8a (Maintenance)
	PROC8b (Marine)
	PROC8b (Road/Rail)
	PROC15
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
	ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
	ERC5 Industrial use resulting in inclusion into or onto a matrix
	ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
Environmental release categories [ERC]	ERC6b Industrial use of reactive processing aids
	ERC6c Industrial use of monomers for manufacture of thermo-plastics
	ERC6d Industrial use of process regulators for polymerisation processes in production of resins,
	rubbers, polymers
	ERC7 Industrial use of substances in closed systems
Specific Environmental Release Categories SPERC	ESVOC SpERC 1.1b.v1

2.0 Operational conditions and risk man	nagement measures			
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid with low volatility.			
Vapour pressure (kPa)	<0.5 @ STP			
Concentration of substance in product	Covers concentrations up to 1	00%		
Human factors not influenced by risk m	anagement			
Potential exposure area	Not defined			
Frequency and duration of use				
	PROC1, PROC8a	Covers daily exposures up to 8 hours (unless stated differently).		
	(Maintenance), PROC15	Covers daily exposures up to o riours (unless stated differently).		
Exposure duration per day	PROC2 (Storage), PROC3,			
Exposure duration per day	PROC8b (Marine), PROC8b	Covers exposure up to 4 hours		
	(Road/Rail)			
	PROC2, PROC2 (Sampling)	Covers exposure up to 15 minutes		
Exposure duration per year	300 days per year	300 days per year		
Other operational conditions affecting v	vorker exposure			
Area of use	All contributing scenarios	Not defined (default = Indoor)		
Characteristics of the surroundings	Not defined			
0	.,.			

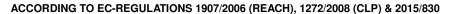
General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. 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 (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear

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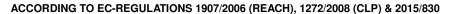


respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

need for risk based health surveillance.					
Technical conditions of use					
PROC1, PROC2, PROC3		Handle substance within a closed system.			
PROC2 (Sampling)		Sample via a closed loop or other system to avoid exposure.			
PROC15	Use fume cupboar	Use fume cupboard. (Efficiency of at least 90%)			
Organisational measures					
PROC8b (Marine)	Transfer via enclos	Transfer via enclosed lines., Clear transfer lines prior to de-coupling. Retain drain downs in sealed			
r nocob (Marine)		storage pending disposal or for subsequent recycle.			
PROC8a (Maintenance)	Drain down and flu	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in			
r nocoa (maintenance)			sal or for subsequent recycle. (Dermal: Efficiency of at least 75%)		
PROC8b (Road/Rail)			material transfers are under containment or extract ventilation.		
All other PROC's	No specific measu	ires identifie	d.		
Risk management measures related to human health					
Respiratory protection	No special measu	res are required.			
	PROC15		Wear suitable gloves tested to EN374. Efficiency of at least 80%		
Hand and/or Skin protection	PROC8a (Mainten	nance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.		
	All other PROC's		Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Efficiency of at least: 90%.		
Eye Protection	No special measu				
			cording to Article 37(4) of REACH do not apply		
Assumes activities are at ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented. Use long handled tools where possible PROC8a (Maintenance) Decontaminate tools, equipment and personal protective equipment in a segre			egated area PROC8a (Maintenance)		
2.2 Control of environmental exposure					
Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		1.7E+06			
Fraction of Regional tonnage used locally	: tons/vear	2.0E-03			
Annual site tonnage (tons/year):		3.4E+03			
Average daily use (kg/day)		3.4E+04			
Environment factors not influenced by	risk management	1			
Flow rate of receiving surface water (m³/d		18,000			
Local freshwater dilution factor:	,	10			
Local marine water dilution factor:		100			
Operational conditions		1			
Emission days (days/year):		100			
Release fraction to air from process (initia RMM):	al release prior to	1.0E-04			
Release fraction to wastewater from proce to RMM):	ess (initial release prior	1.0E-07			
Release fraction to soil from process (initi RMM):	al release prior to	1.0E-05			
Technical onsite conditions and measu	ures to reduce or limit	discharges	air emissions and releases to soil		
Treat air emission to provide a typical rem		90	a sandione and released to son		
Treat onsite wastewater (prior to receiving	, , ,				
provide the required removal efficiency of		0			
	Treat soil emission to provide a typical removal efficiency of (%):		0		
Organisational measures to prevent/lin	• ' '	1 -			
Do not apply industrial sludge to natural s		cinerated. c	ontained or reclaimed.		
Conditions and measures related to me					
Size of municipal sewage system/treatme		2000			
1 0 7 1 (7					
Conditions and measures related to ex	ternal treatment of was	90.4 ste for dispe	osal		
External treatment and disposal of waste					
Substance release quantities after risk			and an industrial regulations.		
Release to waste water from process (mg		Not define	d		
The state to make maker from process (mg	r · /	1	-		

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Maximum allowable site tonnage (MSafe) (kg/d): 4.6E+04

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

ECETOC TRA

	Inha	lation	De	rmal	Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.04	0.03	0.57	0.61
PROC2	0.04	0.19	0.03	0.5	0.76
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC2 (Sampling)	0.04	0.19	0.03	0.57	0.76
PROC3	0.04	0.21	0.03	0.57	0.78
PROC8a (Maintenance)	0.00	0.01	0.05	0.83	0.85
PROC8b (Marine)	0.06	0.36	0.03	0.57	0.92
PROC8b (Road/Rail)	0.03	0.19	0.03	0.57	0.76
PROC15	0.05	0.28	0.01	0.10	0.38

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	1.7E-04 mg/l	1.6E-05 mg/l	1.6E-06 mg/l	5.2E-02 mg/kg ww	1.4 mg/kg ww	3.1E-02 mg/kg ww
Risk characterisation ratio (RCR)	8.8E-04	2.8E-03	2.8E-04	2.1E-05	5.7E-03	3.5E-04

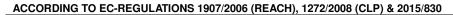
Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	11	0.73
Inhalation	0.016	3.2E-04

4. Evaluation guidance to d	ownstream user
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. 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 allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.

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Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.		
Exposure assessment	Worker	ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



Exposure Scenario 2 - Formulation and (re)packing of Gas oils (petroleum), heavy vacuum

1.0 Contributing Scenarios				
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)			
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC2 (Sampling) PROC3 PROC8a (Maintenance) PROC8b (Marine) PROC8b (Road/Rail) PROC8b (Drum) PROC15			
Chemical product category [PC]	not applicable			
Article Categories [AC]	not applicable			
Environmental release categories [ERC]	ERC2 Formulation of preparations			
Specific Environmental Release Categories SPERC	ESVOC SpERC 2.2.v1			

2.0 Operational conditions and risk man	agement measures			
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid with low volatility.	Liquid with low volatility.		
Vapour pressure (kPa)	<0.5 @ STP			
Concentration of substance in product	Covers concentrations up to 1	Covers concentrations up to 100%		
Human factors not influenced by risk m	anagement			
Potential exposure area	Not defined			
Frequency and duration of use				
	PROC1, PROC8a	Covers daily exposures up to 8 hours (unless stated differently).		
	(Maintenance), PROC15	Covers daily exposures up to o riours (unless stated differently).		
	PROC2 (Storage), PROC3,	Covers exposure up to 1-4 hours		
Exposure duration per day	PROC8b (Marine)	Covers exposure up to 1-4 flours		
	PROC8b (Road/Rail),	Covers exposure up to 1 hour(s)		
	PROC8b (Drum)	Covers exposure up to 1 nour(s)		
	PROC2, PROC2 (Sampling)	Covers exposure up to 15 minutes		
Exposure duration per year	300 days per year			
Other operational conditions affecting v	•			
Area of use	All contributing scenarios	Not defined (default = Indoor)		
Characteristics of the surroundings	Not defined			

General measures applicable to all activities

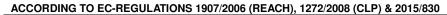
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard 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 (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Technical conditions of use	
PROC1, PROC2, PROC2 (Sampling),	Handle substance within a closed system.

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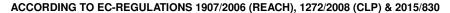




PROC2, PROC2 (Sampling), PROC3 PROC8b (Marine) PROC8b (Road/Rail), PROC8b (Drum)				
PROC8b (Marine)	Sample via a closed loop or other system to avoid exposure.			
PROC8h (Road/Rail) PROC8h (Drum)	Transfer via enclosed lines.			
i i locob (i load/i lali), i i locob (biulii)	Ensure material tra	ansfers are u	inder containment or extract ventilation.	
PROC8b (Drum)	In case of Indoor u		a good standard of general ventilation (not less than 3 to 5 air	
PROC15	Use fume cupboar			
Organisational measures	Ose fume cupboai	u. Liliciency	of at least 90 %	
PROC8a (Maintenance)	Drain down and flu	ich evetam r	prior to equipment break-in or maintenance. Retain drain downs in	
			al or for subsequent recycle. Use long handled tools where possible.	
,		•	coupling. Drain down and flush system prior to equipment break-in or ons in sealed storage pending disposal or for subsequent recycle.	
PROC8b (Road/Rail)	IF exposed: > 1 ho	our: Ensure r	naterial transfers are under containment or extract ventilation.	
All other PROC's	No specific measu	res identified	d.	
Risk management measures related to hum	an health			
Respiratory protection	No special measur	res are requi	red.	
All other PROC's		·	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Efficiency of at least 90%	
Hand and/or Skin protection	PROC8a (Mainten	ance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Efficiency of at least 80%	
	PROC15		Wear suitable gloves tested to EN374. Efficiency of at least 80%	
Eye Protection	No special measur	res are requi		
	<u>'</u>		cording to Article 37(4) of REACH do not apply	
Assumes activities are at ambient temperature			cording to Article or (4) of the Aort do not apply	
Assumes a good basic standard of occupationa				
Use long handled tools where possible PROC		ienteu.		
Decontaminate tools, equipment and personal		nt in a seare	nated area - PROC8a (Maintenance)	
2.2 Control of environmental exposure	protective equipme	iii iii a segie	gated area: -1 11000a (Maintenance)	
Amounts used		0.1		
Fraction of EU tonnage used in region:		0.1		
Regional use tonnage (tons/year):	1	1.7E+05		
Fraction of Regional tonnage used locally: tons	year	1.8E-01		
Annual site tonnage (tons/year):		3.0E+04		
Average daily use (kg/day)		1.0E+05		
Environment factors not influenced by risk	management	T 10 000		
Flow rate of receiving surface water (m³/d):		18,000		
Local freshwater dilution factor:		10		
Local marine water dilution factor:		100		
	Operational conditions			
Operational conditions				
Operational conditions Emission days (days/year):		300		
Operational conditions	ase prior to	300 2.2E-03		
Operational conditions Emission days (days/year): Release fraction to air from process (initial release				
Operational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (in to RMM): Release fraction to soil from process (initial release RMM):	nitial release prior	2.2E-03 5.0E-06 1.0E-04		
Operational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (in to RMM): Release fraction to soil from process (initial release fraction to soil	nitial release prior	2.2E-03 5.0E-06 1.0E-04	air emissions and releases to soil	
Operational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (in to RMM): Release fraction to soil from process (initial release RMM):	nitial release prior ease prior to	2.2E-03 5.0E-06 1.0E-04	air emissions and releases to soil	
Coperational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (into RMM): Release fraction to soil from process (initial release RMM): Technical onsite conditions and measures to the total remission to provide a typical removal of the total removal of the total remission to provide a typical removal of the total re	nitial release prior ease prior to to reduce or limit of efficiency of (%):	2.2E-03 5.0E-06 1.0E-04 discharges,	air emissions and releases to soil	
Coperational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (into RMM): Release fraction to soil from process (initial release RMM): Technical onsite conditions and measures to the treat air emission to provide a typical removal of treat onsite wastewater (prior to receiving water provide the required removal efficiency of (%):	nitial release prior ease prior to to reduce or limit of efficiency of (%): er discharge) to	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1	air emissions and releases to soil	
Coperational conditions Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (into RMM): Release fraction to soil from process (initial release RMM): Technical onsite conditions and measures to the treat air emission to provide a typical removal of the required removal efficiency of (%): Treat soil emission to provide a typical removal	nitial release prior ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%):	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1		
Common practices vary across sites thus constructions Emission days (days/year): Release fraction to air from process (initial release fraction to wastewater from process (in to RMM): Release fraction to soil from process (initial release fraction	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1		
Common practices vary across sites thus considerational measures to prevent/limit reports to provent/limit reports to provent/limit reports to provide a typical removal common practices vary across sites thus considerational measures to prevent/limit reports to descriptions and measures to prevent/limit reports to descriptions and measures to prevent/limit reports to descriptions and the provide the required removal efficiency of (%): Organisational measures to prevent/limit reports to description to air from process (initial release fraction to soil from process (initial release fraction f	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re lease from site	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estima	tes used.	
Common practices vary across sites thus const.	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re lease from site Sludge should be in	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estima	tes used.	
Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (initial release fraction to wastewater from process (initial release fraction to soil from process (initial release fraction from process (initial release fracti	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re lease from site Sludge should be in pal sewage treatm	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estima cinerated, co	tes used.	
Emission days (days/year): Release fraction to air from process (initial release RMM): Release fraction to wastewater from process (initial release fraction to wastewater from process (initial release fraction to soil from process (initial release fraction to RMM): Technical onsite conditions and measures (initial release fraction to soil from process (initial release fraction to RMM): Technical onsite conditions and measures (initial release fraction to RMM): Technical onsite conditions and measures (initial release fraction to RMM): Technical onsite conditions and measures (initial release fraction to RMM): Technical onsi	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re lease from site Sludge should be in pal sewage treatm	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estimation cinerated, coent plant 2000	tes used.	
Common practices vary across sites thus consultance of motional measures to prevent/limit resultance of motional measures to provide a typical removal common practices vary across sites thus consultance on the motional measures to provide a typical removal common practices vary across sites thus consultance on the measures to provide a typical removal common practices vary across sites thus consultance on the measures to prevent/limit resultance of measures and measures related to municipal sewage system/treatment plant degradation effectiveness (%)	ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process representative process repr	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estimated, content plant 2000 90.4	ntes used. Contained or reclaimed.	
Emission days (days/year): Release fraction to air from process (initial release fraction to air from process (initial release fraction to wastewater from process (initial release fraction to wastewater from process (initial release fraction to soil from process (initial release fractions and measures to process (initial release fraction to soil from process (initial release fraction from process (initial release fraction from process (initial release fraction fractions and measures to process (initial release fraction	nitial release prior ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process re lease from site Sludge should be in the pal sewage treatment (m³/d) al treatment of was	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estimated, content plant 2000 90.4 ste for dispose	ontained or reclaimed.	
Common practices vary across sites thus consultance of motional measures to prevent/limit resultance of motional measures to provide a typical removal common practices vary across sites thus consultance on the motional measures to provide a typical removal common practices vary across sites thus consultance on the measures to provide a typical removal common practices vary across sites thus consultance on the measures to prevent/limit resultance of measures and measures related to municipal sewage system/treatment plant degradation effectiveness (%)	nitial release prior ease prior to to reduce or limit of efficiency of (%): er discharge) to efficiency of (%): ervative process release from site Sludge should be in pal sewage treatment (m³/d) al treatment of was discomply with appli	2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0 lease estimated, content plant 2000 90.4 ste for disponsible local actions and actions and actions are actions.	ontained or reclaimed.	

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0.68

0.38

Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	1.1E+05

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Process category

[PROC]

PROC1

PROC2

PROC2

(Storage) PROC2

(Sampling) PROC3

PROC8a

(Maintenance) PROC8b

> (Marine) PROC8b

(Road/Rail) PROC8b

(Drum) PROC15

ECETOC TRA Exposure assessment (method/calculation model)

0.01

0.04

0.04

0.04

0.04

0.00

0.06

0.03

0.02

0.05

Inhalation Dermal Combined inhalation Risk Risk Risk dermal exposure exposure characterisation characterisation characterisation (mg/kg bw/day) (mg/m^3) ratio (RCR) ratio (RCR) ratio (RCR) 0.04 0.03 0.57 0.61 0.19 0.03 0.57 0.76 0.21 0.03 0.57 0.78 0.03 0.57 0.19 0.76 0.21 0.03 0.57 0.78 0.013 0.05 0.83 0.85 0.36 0.03 0.57 0.92 0.03 0.57 0.19 0.76

0.03

0.01

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

0.57

0.10

Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

0.12

0.28

Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.5E-02 mg/l	2.4E-03 mg/l	2.4E-04 mg/l	6.3E-02 mg/kg ww	1.8 mg/kg ww	4.2E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.3E-01	4.1E-01	4.1E-02	3.1E-03	4.8E-01	4.8E-02

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	1.1E+02	7.7*
Inhalation	1.6E+01	3.2E-01

^{*} The Lead Registrant has subsequently performed a new environmental risk assessment and all RCRs < 1. To be communicated in the next ES update

4. Evaluation guidance to de	ownstream user
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-

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	industries-libraries.html).		
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. 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 allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.		
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.		
Evacure accomment	Worker	ECETOC TRA	
Exposure assessment instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



Exposure Scenario 3 – Use as a fuel (Industrial)

1.0 Contributing Scenarios			
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites		
	PROC1		
	PROC2		
	PROC2 (Fuel filtering)		
	PROC2 (Storage)		
Process category [PROC]	PROC3		
	PROC8a (Maintenance)		
	PROC8b (Bulk)		
	PROC8b (Drum)		
	PROC16		
Chemical product category [PC]	not applicable		
Article Categories [AC]	not applicable		
Environmental release categories [ERC]	ERC7 Industrial use of substances in closed systems		
Specific Environmental Release Categories	ESVOC SpERC 7.12a.v1		
SPERC			

2.0 Operational conditions and risk man	agement measures			
2.1 Control of worker exposure				
Product characteristics				
Physical form of product	Liquid with low volatility.			
Vapour pressure (kPa)	<0.5 @ STP	<0.5 @ STP		
Concentration of substance in product	Covers concentrations up to 100%			
Human factors not influenced by risk m	anagement			
Potential exposure area	Not defined			
Frequency and duration of use				
Exposure duration per day	PROC1, PROC8a (Maintenance), PROC16	Covers daily exposures up to 8 hours (unless stated differently).		
	PROC2 (Fuel filtering), PROC2 (Storage), PROC8b (Bulk)	Covers exposure up to 4 hour(s)		
	PROC3	Covers exposure up to 1 - 4 hour(s)		
	PROC2, PROC8b (Drum)	Covers exposure up to 1 hour(s)		
Exposure duration per year	300 days per year			
Other operational conditions affecting v	vorker exposure			
Area of use	PROC1,	Outdoor		
Alea oi use	All other PROC's	Not defined, Default - Indoor		
Characteristics of the surroundings	Not defined	•		
Comerci managerina amulicable to all activ	.tat			

General measures applicable to all activities

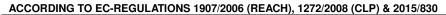
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard 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 (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Technical conditions of use

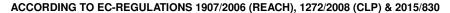
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Handle substance	within a clos	sed system.		
Provide a good sta	andard of ge	neral ventilation (not less than 3 to 5 air changes per hour).		
Transfer via enclos	sed lines.			
		orior to equipment break-in or maintenance. Retain drain downs in sal or for subsequent recycle. Dermal Efficiency of at least 75%		
	res are requ	ired.		
PROC1, PROC2, (Fuel filtering), PR (Storage), PROC3	PROC2 OC2 3, PROC8b	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Efficiency of at least 90%		
-		Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Efficiency of at least 95%		
No special measures are required.				
	ligations ac	cording to Article 37(4) of REACH do not apply		
		egated area PROC8a (Maintenance)		
1 (not less than 3 to 5	5 air change	s per hour). – PROC16		
	0.1			
	1.3E+05			
ıs/year	1.0E+00			
	1.3E+05			
	4.4E+05			
k management	1			
	18.000			
Flow rate of receiving surface water (m³/d): Local freshwater dilution factor:				
Local marine water dilution factor:				
Operational conditions				
Emission days (days/year):				
Release fraction to air from process (initial release prior to RMM):				
Release fraction to wastewater from process (initial release prior to RMM):				
Release fraction to soil from process (initial release prior to RMM):		0 discharges air emissions and releases to soil		
	discharges, air emissions and releases to soil			
	95.0			
:	97.7			
	76.3			
servative process re	elease estimates used. Prevent discharge of undissolved substance to or recover			
release from site				
Sludge should be in		ontained or reclaimed.		
Sludge should be in cipal sewage treatm	ent plant	ontained or reclaimed.		
Sludge should be in	2000	ontained or reclaimed.		
Sludge should be in cipal sewage treatm	ent plant	ontained or reclaimed.		
Sludge should be in cipal sewage treatm	2000 97.7			
Sludge should be in cipal sewage treatm lant (m³/d)	ent plant 2000 97.7 ste for dispo	osal		
Sludge should be in cipal sewage treatmal lant (m³/d) nal treatment of was no waste of the substances the management of the substances the substance the substances the substances the substances the substances the substances the substances the substance the sub	2000 97.7 ste for disposatance is geneols.	osal		
Sludge should be in cipal sewage treatment (m³/d) nal treatment of was no waste of the subst	2000 97.7 ste for disposatance is geneols.	osal		
Sludge should be in cipal sewage treatmal lant (m³/d) nal treatment of was no waste of the substances the management of the substances the substance the substances the substances the substances the substances the substances the substances the substance the substance the substance the substances the substance the substance the substances the substance the s	2000 97.7 set for disposance is general.	osal		
	Transfer via enclo Drain down and flusealed storage pe No specific measuman health No special measu PROC1, PROC2, (Fuel filtering), PR (Storage), PROC36 (Bulk), PROC8b (IPROC16 PROC8a (Mainter No special measuman health No special measuman health No special measuman health Roc8a (Mainter No special measuman health Roc8a (Mainter No special measuman health Roc8a (Mainter Roc8a (Mainter) Roc8a (Mai	Transfer via enclosed lines. Drain down and flush system is sealed storage pending disposed. No specific measures identified in the sealed storage pending disposed. No special measures are requivered. PROC1, PROC2, PROC2 (Fuel filtering), PROC2 (Storage), PROC3, PROC8b (Bulk), PROC8b (Drum), PROC16 PROC8a (Maintenance) No special measures are requivered. No special measures are requiv		

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Maximum allowable site tonnage (MSafe) (kg/d): 4.4E+05

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(m g/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.039	0.03	0.57	0.61
PROC2	0.03	0.17	0.03	0.57	0.73
PROC2 (Fuel filtering)	0.04	0.21	0.03	0.57	0.78
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC3	0.04	0.21	0.03	0.57	0.92
PROC8a (Maintenance)	0.00	0.013	0.05	0.83	0.85
PROC8b (Bulk)	0.06	0.36	0.03	0.57	0.92
PROC8b (Drum)	0.03	0.19	0.03	0.57	0.78
PROC16	0.01	0.06	0.03	0.83	0.85

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	4.7E-02 mg/l	4.6E-03 mg/l	4.6E-04 mg/l	5.7E-02 mg/kg ww	2.2 mg/kg ww	7.9E-02 mg/kg ww
Risk characterisation ratio (RCR)	2.5E-01	7.8E-01	7.8E-02	1.4E-03	9.1E-01	9.1E-02

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	52	3.4*
Inhalation	7.2	1.4E01

^{*} The Lead Registrant has subsequently performed a new environmental risk assessment and all RCRs < 1. To be communicated in the next ES update

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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).				
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management				

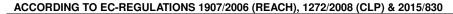
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	Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.		
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.		
Exposure assessment instrument/tool/method	Worker	ECETOC TRA	
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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Exposure Scenario 4 – Use as a fuel (Professional)

1.0 Contributing Scenarios	
Sector of uses SU Su22 Professional uses: Public domain (administration, education, entertainment, service craftsmen)	
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum) PROC 8b (Refueling) PROC16
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems
Specific Environmental Release Categories SPERC	ESVOC SpERC 9.12b.v1

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid with low volatility.				
Vapour pressure (kPa)	<0.5 @ STP				
Concentration of substance in product	Covers concentrations up to	100%			
Human factors not influenced by risk m	anagement				
Potential exposure area	Not defined				
Frequency and duration of use	·				
	PROC1, PROC8a (Maintenance), PROC16	Covers daily exposures up to 8 hours (unless stated differently).			
	PROC2 (Storage)	Covers exposure up to 4 hours			
Exposure duration per day	PROC2, PROC8b (Bulk), PROC8b (Drum), PROC8b (refuelling)	Covers exposure up to 1 hour(s)			
	PROC3	Covers exposure up to 15 minutes			
Exposure duration per year	e duration per year 365 days per year				
Other operational conditions affecting worker exposure					
Area of use	All PROC's	Not defined, default - indoor			
Characteristics of the surroundings	ings Not defined				

General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. 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 (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe

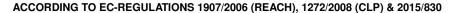
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systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Technical conditions of use PROC1, PROC2, PROC2 (Storage), Handle substance within a closed system. PROC3, PROC16 PROC2, PROC3, PROC8b (bulk), PROC8b Provide a good standard of controlled ventilation (10 to 15 air changes per hour). (Drum) PROC2 (Storage), PROC8a (Maintenance) Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Organisational measures Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in PROC8a (Maintenance) sealed storage pending disposal or for subsequent recycle. Dermal Efficiency of at least 75% All other PROC's No specific measures identified. Risk management measures related to human health Respiratory protection No special measures are required. PROC1, PROC2 (Storage), Wear chemically resistant gloves (tested to EN374) in combination PROC3, PROC8b (Drum), with 'basic' employee training. Efficiency of at least 90% Hand and/or Skin protection PROC8b (refuelling), PROC2, PROC8a Wear chemically resistant gloves (tested to EN374) in combination (Maintenance) with specific activity training. Efficiency of at least 95% Eye Protection No special measures are required. Additional good practice advice beyond the REACH CSA. Obligations according to Article 37(4) of REACH do not apply Use long handled tools where possible. - PROC8a (Maintenance) Decontaminate tools, equipment and personal protective equipment in a segregated area. - PROC8a (Maintenance) Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. – PROC8b (bulk), PROC8b (Drum) 2.2 Control of environmental exposure Amounts used Fraction of EU tonnage used in region: 0.1 Regional use tonnage (tons/year): 3.4E+04 Fraction of Regional tonnage used locally: tons/year 5.0E-04 Annual site tonnage (tons/year): 1.7E+01 Average daily use (kg/day) 4.7E+01 Environment factors not influenced by risk management 18,000 Flow rate of receiving surface water (m3/d): Local freshwater dilution factor: 10 100 Local marine water dilution factor: Operational conditions 365 Emission days (days/year): Release fraction to air from process (initial release prior to 1.0E-04 Release fraction to wastewater from process (initial release prior 1.0E-05 to RMM): Release fraction to soil from process (initial release prior to 1.0E-05 Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Treat air emission to provide a typical removal efficiency of (%): 0 Treat onsite wastewater (prior to receiving water discharge) to 0 provide the required removal efficiency of (%): Treat soil emission to provide a typical removal efficiency of (%): Common practices vary across sites thus conservative process release estimates used. Organisational measures to prevent/limit release from site Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. Conditions and measures related to municipal sewage treatment plant Size of municipal sewage system/treatment plant (m³/d) 2000 90.4 Degradation effectiveness (%) Conditions and measures related to external treatment of waste for disposal This substance is consumed during use and no waste of the substance is generated. Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. Substance release quantities after risk management measures

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Maximum allowable site tonnage (MSafe) (kg/d): 6.4E+01

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)

ECETOC TRA

	Inhalation		De	Combined	
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisatio ratio (RCR)
PROC1	0.01	0.056	0.03	0.57	0.62
PROC2	0.06	0.33	0.02	0.28	0.62
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC3	0.03	0.18	0.03	0.57	0.73
PROC8a (Maintenance)	0.01	0.05	0.05	0.83	0.88
PROC8b (Bulk)	0.03	0.19	0.03	0.57	0.76
PROC8b (Drum)	0.03	0.19	0.03	0.57	0.76
PROC8b (refuelling)	0.03	0.19	0.03	0.57	0.76
PROC16	0.01	0.06	0.03	0.57	0.62

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.3E-05 mg/l	1.6E-05 mg/l	2.3E-07 mg/l	5.2E-02 mg/kg ww	1.4 mg/kg ww	3.1E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.2E-04	3.2E-03	3.8E-05	2.4E-04	2.9E-03	7.0E-05

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (μg/kg/day)	Risk characterisation ratio (RCR)
Oral	11	7.3E-01
Inhalation	8.7E-03	1.7E-04

4. Evaluation guidance to d	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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).				
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. 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 allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.				

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Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.		
Exposure assessment	Worker	ECETOC TRA	
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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