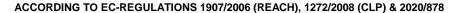
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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name Gas oils (petroleum), heavy vacuum

Product description V3015-LIGHT CYCLE OIL-Gas oils (petroleum), heavy vacuum

 Trade Name
 LIGHT CYCLE OIL

 Product code
 LCO, V3015

 CAS No.
 64741-57-7

 EC No.
 265-058-3

REACH Registration No. 01-2119487294-29-xxxx

1.2 Relevant identified uses of the substance or mixture

and uses advised against

Identified use(s) No **Exposure Scenario** Page: 1 Distribution of Gas oils (petroleum), heavy vacuum 12 2 Formulation and (re)packing of Gas oils (petroleum), heavy 16 vacuum 3 Use as a fuel (Industrial) 20 Use as a fuel (Professional) 23

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 1201 Geneva Switzerland +31 10 498 7200 +31 10 452 9545 xreach@vitol.com

1.4 Emergency Telephone Number

E-mail (competent person)

Telephone

Fax

Emergency Phone No. +44 (0) 1235 239 670, 24/7
Language(s) 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 description V3015-LIGHT CYCLE OIL-Gas oils (petroleum), heavy vacuum

Hazard Pictogram(s)





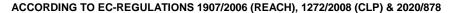


Signal Word(s) DANGER

Hazard Statement(s) H304: May be fatal if swallowed and enters airways.

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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.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or

doctor/physician.

P331: Do NOT induce vomiting.

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. 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 least aircumptances.

local circumstances.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

SUBSTANCE	CAS No.	EC 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

Self-protection of the first aider

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

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

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

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.

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.

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

H2S Warning:

Inhalation

Skin contact

Eye contact

Ingestion

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attention.

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



4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed

Notes to a physician:

aspiration. 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.

Vapour may be irritant to the respiratory tract. Repeated and/or prolonged skin contact may cause irritation. May cause eye irritation. 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 the label where possible).

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.

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 firefighters

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

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.

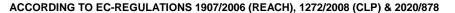
Evacuate the area and keep personnel upwind. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. Avoid all contact. Wear chemical protection suit and breathing apparatus. See Also Section: 8

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

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Spillages onto land:

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 iet.

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

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.

Reference to other sections See Section: 8,13

SECTION 7: HANDLING AND STORAGE

Spillages on water or at sea:

7.1 Precautions for safe handling

6.4

H2S Warning:

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature Storage measures Incompatible materials

Incompatible materials
7.3 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

Stable at ambient temperatures. Keep only in original packaging.

explosive vapours inside the container.

Keep away from oxidising agents. Strong acids and Alkalis.

See Section: 1.2 and/or Exposure Scenario

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational exposure limits Not applicable

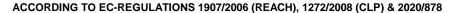
8.1.2 Biological limit value Not established

8.1.3 PNECs and DNELs DNEL: Not established

PNEC: Gas oils (petroleum), heavy vacuum is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the

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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

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.

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.

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



When the product is heated/ln 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

Thermal hazards 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

Physical state Liquid

Colour
Odour
Characteristic
Melting point/freezing point
Reling point or initial boiling point and boiling range
Flammability
Lower and upper explosion limit
May be coloured
Characteristic
< 30 °C at 101 kPa
350 – 600 °C
Non-flammable.
Not established

Flash point > 75 °C

Auto-ignition temperature > 337 °C

Decomposition temperature Not established PH Not established

Kinematic viscosity 7 – 20.5 mm²/s at 40 °C (<60 mm²/s at 100 °C)

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



Solubility Water: 0.4 mg/l at 20 °C slightly soluble.

Partition coefficient: n-octanol/water (log value) 2.7 – 6

Vapour pressure > 0.5 kPa at 20°C Density and/or relative density 0.80 - 0.99 g/cm³ at 15 °C

Relative vapour density > 1

Particle characteristics Not established

9.2 Other information Vapour may create explosive atmosphere.

SECTION 10: STABILITY AND REACTIVITY

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

10.5 Incompatible materialsKeep away from heat, sources of ignition and direct sunlight.Keep away from oxidising agents. Strong acids and Alkalis.

10.6 Hazardous decomposition products 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

Aspiration hazard

11.1 Information on hazard classes as defined in All test data taken from existing ECHA registrations for the substances

Regulation (EC) No 1272/2008 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/irritationBased 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/irritation Based upon the available data, the classification criteria are not met.

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

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

Sensitisation (guinea pig) - Negative (OECD 406)

Germ cell mutagenicity Based 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.

Reproductive toxicity: No data available.

Developmental toxicity: Positive (rat) EPA OTS 798.4900

STOT - Single ExposureBased upon the available data, the classification criteria are not met.

Weight of evidence approach.

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

exposure.

Oral: No data available. Inhalation: No data available.

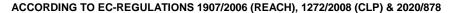
Dermal: NOAEL: 1.06 mg/kg bw/day (rat) (OECD 410)

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

Kinematic viscosity: $7 - 20.5 \text{ mm}^2\text{/s}$ at 40 °C (<60 mm²/s at 100 °C)

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11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

11.2.2 Other information

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	Aquatic Acute 1; Very toxic to aquatic life.
		Aquatic Chronic 1; Very toxic to aquatic life with long lasting effects.
	Short Term (acute):	EL50: (48 hour) (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
12.4	Mobility in soil	Substance is complex UVCB. Standard tests for this endpoint are intended for
		single substances and are not appropriate for this complex substance
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 humans as no components meets the criteria.

12.7 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)

Waste classification according to Directive 2008/98/EC (Waste Framework Directive)

HP5, HP6, HP7, HP10, HP14

SECTION 14: TRANSPORT INFORMATION

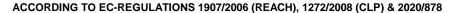
		ADR/RID	IMDG/ADN
14.1	UN number or ID number	UN 1202	UN 1202
14.2	UN proper shipping name	GAS OIL	GAS OIL
14.3	Transport hazard class(es)	3	3+(N1, CMR, F)
14.4	Packing group	III	III
14.5	Environmental hazards	Environmentally hazardous substance	Classified as a Marine Pollutant.
14.6	Special precautions for user	See Section: 2	
14.7	Maritime transport in bulk according to IMO instruments	No information available.	No information available.
14.8	Additional information	HIN: 30	EmS: F-E, S-E
		Tunnel restriction code: 3 D/E	Limited Quantity: 5L
		Limited Quantity: 5L	
		Special provisions: 640M, 664	

SECTION 15: REGULATORY INFORMATION

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

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15.1.1 **EU** regulations

> Annex XVII (Restrictions) 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 closed

system.

Upper Tier: 25000 tonnes Seveso

Lower Tier: 2500 tonnes

15.1.2 National regulations

Water hazard class: 3 Germany

15.2 A REACH chemical safety assessment (CSA) has been carried out. Refer to **Chemical Safety Assessment**

annexes for exposure scenarios detailing use specific exposure controls.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: New SDS Regulation 2020/878 format, all sections have been updated to include new information. Please review SDS with care.

References:

Existing Safety Data Sheet (SDS).

Harmonised Classification(s) for Gas oils (petroleum), heavy vacuum (CAS No. 64741-57-7).

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

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

CAS Chemical Abstracts Service

CLP Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures

EC **European Community ECHA European Chemicals Agency**

EL50 EL50: Loading rate of test substance (in dilution water) which causes adverse effects in 50% of exposed population

EU **European Union DNEL** Derived no effect level

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

I TFI Long term exposure limit

No Observed Adverse Effect Level NOAFI

OECD Organisation for Economic Cooperation and Development

PBT PBT: Persistent, Bioaccumulative and Toxic

PNEC Predicted No Effect Concentration

Registration, Evaluation, Authorisation and Restriction of Chemicals **REACH**

RID: Regulations concerning the international railway transport of dangerous goods RID

STEL Short term exposure limit

UN United Nations

UVCB Unknown or Variable Composition, Complex reaction products or Biological materials

vPvB vPvB: very Persistent and very Bioaccumulative

Hazard classification / Classification code:

Asp. Tox. 1; Aspiration hazard, Category 1

Acute Tox. 4; Acute Toxicity, Category 4

Carc. 1B; Carcinogenicity, Category 1B

Repr. 2; Reproductive toxicity, Category 2

STOT RE 2; Specific target organ toxicity — repeated exposure,

Category 2

Aguatic Acute 1; Hazardous to the aquatic environment, Acute, Category

Hazard Statement(s)

EUH066: Repeated exposure may cause skin dryness or cracking.

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.

H400: Very toxic to aquatic life.

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



Aquatic Chronic 1; Hazardous to the aquatic environment, Chronic , H410: Very toxic to aquatic life with long lasting effects. Category 1

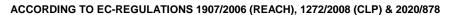
Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

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

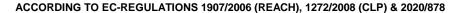
Summary of Parameters

Physical Parameters				
Vapour pressure (kPa	1)		0.02 - 0.791 kPa @ 120°C	
Partition Coefficient (I	og K _{OW})		Individual components vary between 2.92 and 20.43	
Aqueous solubility (m	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	
vvoikeis	Long Torm	Inhalation (mg/m³)	0.18	
	Long Term Dermal (mg/kg bw/day)		0.065	
Inhalation (i		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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Contents

Number	Title	Page:
Exposure scenario 1	Distribution of Gas oils (petroleum), heavy vacuum	12
Exposure scenario 2	Formulation and (re)packing of Gas oils (petroleum), heavy vacuum	16
Exposure scenario 3	Use as a fuel (Industrial)	20
Exposure scenario 4	Use as a fuel (Professional)	23

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/rail) Road tanker/rail car loading.

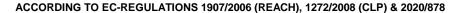
(Drum) Drum/batch transfers.

(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)	
Chemical product category [PC]	PROC8b (Road/Rail) PROC15 not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	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) 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 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 1	00%		
Human factors not influenced by risk ma	nagement			
Potential exposure area	Not defined			
Frequency and duration of use				
	PROC1, PROC8a (Maintenance), PROC15	Covers daily exposures up to 8 hours (unless stated differently).		
Exposure duration per day	PROC2 (Storage), PROC3, PROC8b (Marine), PROC8b (Road/Rail)	Covers exposure up to 4 hours		
	PROC2, PROC2 (Sampling)	Covers exposure up to 15 minutes		
Exposure duration per year	xposure duration per year 300 days per year			
Other operational conditions affecting worker exposure				
Area of use	All contributing scenarios Not defined (default = Indoor)			
Characteristics of the surroundings	Not defined			

General measures applicable to all activities

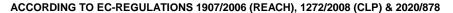
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard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

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Technical conditions of use

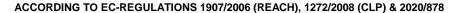




containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory 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	T				
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	rd. (Efficienc	y of at least 90%)		
Organisational measures					
PROC8b (Marine)		Transfer via enclosed lines., Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle.			
PROC8a (Maintenance)	Drain down and flu	ush system p	prior to equipment break-in or maintenance. Retain drain downs in 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				
Risk management measures related to he			··		
Respiratory protection	No special measu	res are requ	ired.		
, , , ,	PROC15		Wear suitable gloves tested to EN374. Efficiency of at least 80%		
Hand and/or Skin protection	PROC8a (Mainter	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				
Additional good practice advice beyond	the REACH CSA. Ob	ligations ac	cording to Article 37(4) of REACH do not apply		
Assumes activities are at ambient temperature. Assumes a good basic standard of occupation Use long handled tools where possible PF Decontaminate tools, equipment and person	onal hygiene is implen ROC8a (Maintenance)	nented.	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: to	ons/year	2.0E-03			
Annual site tonnage (tons/year):		3.4E+03			
Average daily use (kg/day)		3.4E+04	3.4E+04		
Environment factors not influenced by risk management					
Flow rate of receiving surface water (m³/d):		18,000			
Local freshwater dilution factor:		10			
Local marine water dilution factor:		100			
Operational conditions		•			
Emission days (days/year):		100			
Release fraction to air from process (initial reRMM):	elease prior to	1.0E-04			
Release fraction to wastewater from process to RMM):	s (initial release prior	1.0E-07			
Release fraction to soil from process (initial release prior to RMM):		1.0E-05	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 (%):					
Treat onsite wastewater (prior to receiving water discharge) to					
provide the required removal efficiency of (%):		0			
Treat soil emission to provide a typical removal efficiency of (%):		0			
	Organisational measures to prevent/limit release from site				
Do not apply industrial sludge to natural soil		cinerated, c	ontained or reclaimed.		
Conditions and measures related to municipal sewage treatment plant					
Size of municipal sewage system/treatment		2000			
Degradation effectiveness (%)		90.4			
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Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations.		
Substance release quantities after risk management measures		
Release to waste water from process (mg/l) Not defined		
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

	Inhalation		Dermal		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	STP	freshwater	marine water	soil	freshwater	marine
exposure					sediment	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

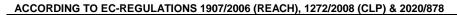
4. Evaluation guidance to downstream user

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).

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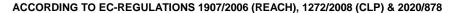




	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management				
Health	Measures/Operational Conditions	are adopted, then users should ensure that risks are managed to at least equivalent			
	levels. Available hazard data do r	not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk			
	Management Measures are based on qualitative risk characterisation.				
	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be				
Environment	necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater				
Livioninent	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			
matiament/tool/method	Limitorinent	exposure with the Petrorisk model.			

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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 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 1	00%				
Human factors not influenced by risk ma	anagement					
Potential exposure area	Not defined					
Frequency and duration of use						
	PROC1, PROC8a (Maintenance), PROC15	Covers daily exposures up to 8 hours (unless stated differently).				
Exposure duration per day	PROC2 (Storage), PROC3, PROC8b (Marine)	Covers exposure up to 1-4 hours				
PROC8b (Road/Rail), PROC8b (Drum) Covers exposure up to 1 hour(s)						
	PROC2, PROC2 (Sampling) Covers exposure up to 15 minutes					
Exposure duration per year 300 days per year						
Other operational conditions affecting worker exposure						
Area of use	All contributing scenarios Not defined (default = Indoor)					
Characteristics of the surroundings	cs of the surroundings Not defined					

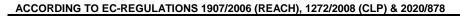
General measures applicable to all activities

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.

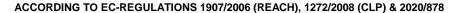
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Technical conditions of use				
PROC1, PROC2, PROC2 (Sampling),	Hamelle and a	dala !	and avertons	
PROC3	Handle substance within a closed system.			
PROC2, PROC2 (Sampling), PROC3	Sample via a closed loop or other system to avoid exposure.			
PROC8b (Marine)	Transfer via enclo			
PROC8b (Road/Rail), PROC8b (Drum)			under containment or extract ventilation.	
PROC8b (Drum)	In case of Indoor of changes per hour)		a good standard of general ventilation (not less than 3 to 5 air of at least 97%	
PROC15	Use fume cupboai			
Organisational measures				
PROC8a (Maintenance)	Drain down and flu	ush system i	prior to equipment break-in or maintenance. Retain drain downs in	
()	sealed storage pending disposal or for subsequent recycle. Use long handled tools where possible.			
PROC8b (Marine)	Clear transfer line	s prior to de	coupling. Drain down and flush system prior to equipment break-in or	
DD0001 (D 1/D 11)			wns in sealed storage pending disposal or for subsequent recycle.	
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 he				
Respiratory protection	No special measu	res are requ		
	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 (Mainter	nance)	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 measu	res are requ		
			cording to Article 37(4) of REACH do not apply	
Assumes activities are at ambient temperatu				
Assumes a good basic standard of occupati	,	• ,		
Use long handled tools where possible PF				
Decontaminate tools, equipment and persor			egated area PROC8a (Maintenance)	
	iai protoctivo oquipinio	nicini a cogic		
2.2 Control of environmental exposure				
2.2 Control of environmental exposure Amounts used			, ,	
Amounts used		0.1		
Amounts used Fraction of EU tonnage used in region:		0.1 1.7E+05		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year):	ons/vear	1.7E+05		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to	ons/year	1.7E+05 1.8E-01		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year):	ons/year	1.7E+05 1.8E-01 3.0E+04		
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Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by rise	-	1.7E+05 1.8E-01 3.0E+04 1.0E+05		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ris Flow rate of receiving surface water (m³/d):	-	1.7E+05 1.8E-01 3.0E+04 1.0E+05		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ri. Flow rate of receiving surface water (m³/d): Local freshwater dilution factor:	-	1.7E+05 1.8E-01 3.0E+04 1.0E+05 18,000 10		
Amounts used Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ri. Flow rate of receiving surface water (m³/d): Local freshwater dilution factor: Local marine water dilution factor:	-	1.7E+05 1.8E-01 3.0E+04 1.0E+05		
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Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ri. 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 remains): Release fraction to wastewater from process to RMM): Release fraction to soil from process (initial RMM): Technical onsite conditions and measure to reat air emission to provide a typical removal efficiency of (%) Treat soil emission to provide a typical removal efficiency of freet soil emission to provide a typical emission to provide a typical emission to provide a typical emission to provide a typica	elease prior to s (initial release prior release prior to	1.7E+05 1.8E-01 3.0E+04 1.0E+05 18,000 10 100 300 2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0	air emissions and releases to soil	
Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ri. 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 remains): Release fraction to wastewater from process to RMM): Release fraction to soil from process (initial RMM): Technical onsite conditions and measure to read air emission to provide a typical removal efficiency of (%) Treat soil emission to provide a typical removal efficiency of (%) Treat soil emission to provide a typical removal emission to provide	elease prior to s (initial release prior release prior to	1.7E+05 1.8E-01 3.0E+04 1.0E+05 18,000 10 100 300 2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0	air emissions and releases to soil	
Fraction of EU tonnage used in region: Regional use tonnage (tons/year): Fraction of Regional tonnage used locally: to Annual site tonnage (tons/year): Average daily use (kg/day) Environment factors not influenced by ri. 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 remains): Release fraction to wastewater from process to RMM): Release fraction to soil from process (initial RMM): Technical onsite conditions and measure to reat air emission to provide a typical removal efficiency of (%) Treat soil emission to provide a typical removal efficiency of freet soil emission to provide a typical emission to provide a typical emission to provide a typical emission to provide a typica	elease prior to s (initial release prior release prior to	1.7E+05 1.8E-01 3.0E+04 1.0E+05 18,000 10 100 300 2.2E-03 5.0E-06 1.0E-04 discharges, 0 80.1 0	air emissions and releases to soil	

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Degradation effectiveness (%)	90.4				
Conditions and measures related to external treatment of waste for disposal					
External treatment and disposal of waste should comply with appli	External treatment and disposal of waste should comply with applicable local and/or national regulations.				
Substance release quantities after risk management measure	Substance release quantities after risk management measures				
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

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 characterisation ratio (RCR)
PROC1	0.01	0.04	0.03	0.57	0.61
PROC2	0.04	0.19	0.03	0.57	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	0.013	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
PROC8b (Drum)	0.02	0.12	0.03	0.57	0.68
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.

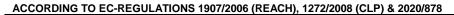
Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.5E-02 mg/l	2.4E-03 mg/l	2.4E-04 mg/l	6.3E-02 mg/kg ww	1.8 mg/kg ww	4.2E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.3E-01	4.1E-01	4.1E-02	3.1E-03	4.8E-01	4.8E-02

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

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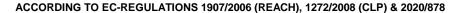




4. Evaluation guidance to downstream user				
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).			
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.			
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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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]	
Specific Environmental Release Categories SPERC	ESVOC SpERC 7.12a.v1

2.0 Operational conditions and risk mar	agement 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 (Maintenance), PROC16	Covers daily exposures up to 8 hours (unless stated differently).				
Exposure duration per day	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	Exposure duration per year 300 days per year					
Other operational conditions affecting worker exposure						
Area of use	PROC1,	Outdoor				
Alea oi use	All other PROC's	Not defined, Default - Indoor				
Characteristics of the surroundings Not defined						
Camanal massaures applicable to all satis	.141					

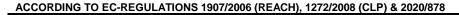
General measures applicable to all activities

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

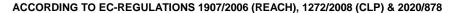
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work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Technical conditions of use PROC1, PROC2, PROC2 (Storage), Handle substance within a closed system. PROC3, PROC16 PROC2 (Fuel filtering), PROC2 (Storage), Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). PROC8b (Drum), PROC16 PROC8b (Bulk) Transfer via enclosed lines. 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, PROC2 (Fuel filtering), PROC2 Wear chemically resistant gloves (tested to EN374) in combination (Storage), PROC3, PROC8b with 'basic' employee training. Efficiency of at least 90% (Bulk), PROC8b (Drum), Hand and/or Skin protection PROC16 Wear chemically resistant gloves (tested to EN374) in combination PROC8a (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) Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). - PROC16 2.2 Control of environmental exposure Amounts used Fraction of EU tonnage used in region: 0.1 Regional use tonnage (tons/year): 1.3E+05 Fraction of Regional tonnage used locally: tons/year 1.0E+00 Annual site tonnage (tons/year): 1.3E+05 4.4E+05 Average daily use (kg/day) Environment factors not influenced by risk management Flow rate of receiving surface water (m3/d): 18,000 10 Local freshwater dilution factor: Local marine water dilution factor: 100 Operational conditions 300 Emission days (days/year): Release fraction to air from process (initial release prior to 5.0E-03 Release fraction to wastewater from process (initial release prior 1.0E-05 to RMM): Release fraction to soil from process (initial release prior to RMM): 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 (%): 95.0 Treat onsite wastewater (prior to receiving water discharge) to 97.7 provide the required removal efficiency of (%): Treat soil emission to provide a typical removal efficiency of (%): 76.3 Common practices vary across sites thus conservative process release estimates used. Prevent discharge of undissolved substance to or recover from onsite wastewater. 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 Degradation effectiveness (%) 97.7 Conditions and measures related to external treatment of waste for disposal

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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

Release to waste water from process (mg/l)

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

	ı	nhalation		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

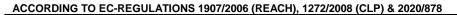
Indirect exposure to humans via the environment:

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

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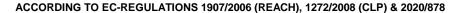




	Where other Risk Management Me managed to at least equivalent lev	easures/Operational Conditions are adopted, then users should ensure that risks are rels.		
For scaling see	Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).			
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.			
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		
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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Exposure Scenario 4 – Use as a fuel (Professional)

1.0 Contributing Scenarios				
Sector of uses SU	SU22 Professional uses: Public domain (administration, education, entertainment, services,			
Sector of uses 30	craftsmen)			
	PROC1			
	PROC2			
	PROC2 (Storage)			
	PROC3			
Process category [PROC]	PROC8a (Maintenance)			
	PROC8b (Bulk)			
	PROC8b (Drum)			
	PROC 8b (Refueling)			
	PROC16			
Chemical product category [PC]	not applicable			
Article Categories [AC]	not applicable			
Facility and a state of the second section (FDC)	ERC9a Wide dispersive indoor use of substances in closed systems			
Environmental release categories [ERC]	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	365 days per year				
Other operational conditions affecting v	vorker exposure				
Area of use	All PROC's	Not defined, default - indoor			
Characteristics of the surroundings	Not defined				

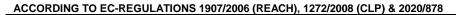
General measures applicable to all activities

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

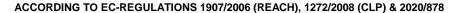
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work or equivalent arrangements are in place based health surveillance.	e to manage risks. R	egularly insp	pect, test and maintain all control measures. Consider the need for ris	
Technical conditions of use				
PROC1, PROC2, PROC2 (Storage),				
PROC3, PROC16	Handle substance within a closed system.			
PROC2, PROC3, PROC8b (bulk), PROC8b (Drum)	Provide a good sta	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).		
PROC2 (Storage), PROC8a (Maintenance)	Provide a good sta	andard of ge	eneral ventilation (not less than 3 to 5 air changes per hour).	
Organisational measures	_ · · · · · · · · · · · · · · · · · · ·	3.		
	Drain down and flu	ısh system i	prior to equipment break-in or maintenance. Retain drain downs in	
PROC8a (Maintenance)			sal or for subsequent recycle. Dermal Efficiency of at least 75%	
All other PROC's	No specific measu		, , ,	
Risk management measures related to hui				
Respiratory protection	No special measu	res are requ	ired.	
, p	PROC1, PROC2 (
	PROC3, PROC8b		Wear chemically resistant gloves (tested to EN374) in combination	
Hand and/or Skin protection	PROC8b (refuelling		with 'basic' employee training. Efficiency of at least 90%	
	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 measu	res are requ	, , ,	
			cording to Article 37(4) of REACH do not apply	
Use long handled tools where possible PRO			· · · · · · · · · · · · · · · · · · ·	
Decontaminate tools, equipment and persona	,		egated area PROC8a (Maintenance)	
			pending disposal or for subsequent recycle. – PROC8b (bulk),	
PROC8b (Drum)		ŭ		
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: tor	ns/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	k management			
Flow rate of receiving surface water (m³/d):	<u> </u>	18,000		
Local freshwater dilution factor:		10		
Local marine water dilution factor:		100		
Operational conditions		L		
Emission days (days/year):		365		
Release fraction to air from process (initial rel	ease prior to			
RMM):	p	1.0E-04		
Release fraction to wastewater from process to RMM):	(initial release prior	1.0E-05		
Release fraction to soil from process (initial re	elease prior to	1.0E-05		
RMM): Technical onsite conditions and measures	to roduce or limit	discharges	air amissions and rologous to sail	
		oiscnarges,	an emissions and releases to som	
Treat air emission to provide a typical remova		U		
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):				
			0	
Common practices vary across sites thus con			ates used	
Organisational measures to prevent/limit r	· ·	ioaso csiiilia	2100 d00d.	
Do not apply industrial sludge to natural soils.		cinerated a	contained or reclaimed	
Conditions and measures related to munic			ontained of fecialities.	
Size of municipal sewage system/treatment p		2000		
Degradation effectiveness (%)	iant (iii7u)	90.4	_	
	nal treatment of we		osal	
Conditions and measures related to extern				
This substance is consumed during use and r Combustion emissions limited by required ext		_	cialcu.	
Compaction officerors infliced by required ext	iadat cittiaaiUH CUHII	010.		

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Ī	Combustion emissions considered in regional exposure assessment.		
	Substance release quantities after risk management measures		
ſ	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

	Inl	nalation	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	0.056	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.

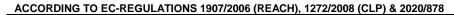
Environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.3E-05 mg/l	1.6E-05 mg/l	2.3E-07 mg/l	5.2E-02 mg/kg ww	1.4 mg/kg ww	3.1E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.2E-04	3.2E-03	3.8E-05	2.4E-04	2.9E-03	7.0E-05

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 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	Worker ECETOC TRA		
instrument/tool/method	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	