

## Safety Data Sheet

according to Reg.1907/2006/EC, Article 31  
rev nr 3

Printing date 17.03.2015

Revision: 16.03.2015

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

**creation date:** 06.01.2006

**Replaced version:** rev. 2

#### 1.1 Product identifier Mixture of fueloil and diesel.

**Trade name:** ISO F RME 180

**Other names of the product:** MARPOL Annex I: fuel and residual oils, including ship's bunkers

**Product Safety number:** COMB-047

**Shipping document (marine transportation only)**

supplied by the concerned commercial department (for marine transportation only).

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

Uses not included in next item are not advised.

**Application of the substance / the mixture**

Marine fuel.

Identified uses and Exposure Scenarios: see section 16

#### 1.3 Details of the supplier of the safety data sheet

**Manufacturer/Supplier:**

Petróleos de Portugal - Petrogal, S.A.

R. Tomás da Fonseca, Torre C, 1600-209 Lisboa, Portugal

Tel.: +351 21 724 25 00

e-mail: ambiente.qualidade.seguranca@galpenenergia.com

#### 1.4 Emergency telephone number: 112 (European Emergency Number)

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

**Classification according to Regulation (EC) No 1272/2008**



GHS08 health hazard

Carc. 1B

H350 May cause cancer.

Repr. 2

H361d Suspected of damaging the unborn child.

STOT RE 2

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



GHS09 environment

Aquatic Acute 1

H400 Very toxic to aquatic life.

Aquatic Chronic 1

H410 Very toxic to aquatic life with long lasting effects.



GHS07

Acute Tox. 4

H332 Harmful if inhaled.

**Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

Carcinogen, cat 2.



T; Toxic

R45:

May cause cancer.



Xn; Harmful

R20-48/21-63:

Harmful by inhalation. Harmful: danger of serious damage to health by prolonged exposure in contact with skin. Possible risk of harm to the unborn child.

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N; Dangerous for the environment

R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R66: Repeated exposure may cause skin dryness or cracking.

**Classification system:** Directive 1999/45/EC and its revisions.**2.2 Label elements****Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labelled according to the CLP regulation.

**Hazard pictograms** GHS07, GHS08, GHS09**Signal word** Danger**Hazard-determining components of labelling:**

Fuel oil, residual

Fuels, diesel

**Hazard statements**

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.

H410 Very toxic to aquatic life with long lasting effects.

**Precautionary statements**

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P273 Avoid release to the environment.

P201 Obtain special instructions before use.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P331 Do NOT induce vomiting.

**Additional information:**

EUH066 Repeated exposure may cause skin dryness or cracking.

Restricted to professional users.

**2.3 Other hazards**

Hydrogen sulphide is highly toxic and may be fatal if inhaled.

Hydrogen sulphide (H<sub>2</sub>S) can accumulate in the headspace of product storage tanks and reach potentially hazardous concentrations, namely in case of prolonged storage.

Even moderate concentrations of Hydrogen Sulphide will rapidly paralyse the sense of smell and this warning sign may be rapidly lost.

Handling the product at high temperatures may cause burns.

See also sections 11 and 12.

**Results of PBT and vPvB assessment****PBT:** See section 12.**vPvB:** See section 12.**SECTION 3: Composition/information on ingredients****3.2 Chemical characterisation: Mixtures****Description:**

Fueloil.

Diesel.

**Dangerous components or components with european exposure limits assigned:**



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CAS: 68476-33-5 EINECS: 270-675-6 Index number: 649-024-00-9 Reg.nr.: 01-2119474894-22-0164	Fuel oil, residual T Carc. Cat. 2 R45;  Xn R20-48/21-63;  N R50/53 R66 Carc. 1B, H350; Repr. 2, H361d; STOT RE 2, H373; Aquatic Acute 1, H400; Aquatic Chronic 1, H410;  Acute Tox. 4, H332	ca. 92%
CAS: 68334-30-5 EINECS: 269-822-7 Index number: 649-224-00-6 Reg.nr.: 01-2119484664-27-0077	Fuels, diesel Xn R20-40-65;  Xi R38;  N R51/53 Carc. Cat. 3 Flam. Liq. 3, H226;  Carc. 2, H351; STOT RE 2, H373; Asp. Tox. 1, H304;  Aquatic Chronic 2, H411;  Acute Tox. 4, H332; Skin Irrit. 2, H315	ca. 8%

**Additional information:**

Sulphur content: 3,5%(w/w)(max)

For the wording of the listed hazard phrases, if they exist, refer to section 16.

For the wording of the listed risk phrases, if they exist, refer to section 16.

**SECTION 4: First aid measures****4.1 Description of first aid measures****General information:**

Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces.

Hydrogen sulphide (H<sub>2</sub>S) can accumulate in the headspace of product storage tanks and reach potentially hazardous concentrations.

Before attempting to rescue casualties, isolate area from all potential sources of ignition including disconnecting electrical supply.

Wear appropriate personal protective equipment to protect against hot product.

**After inhalation:**

Irritation of the respiratory tract due to excess fume, mists or vapour exposure.

If casualty is unconscious and:

Obtain medical advice if symptoms persist.

- Not breathing:

Ensure that there is no obstruction to breathing and give artificial respiration by trained personnel.

If necessary, give external cardiac massage and obtain medical advice.

- Breathing:

Place in the recovery position.

Administer oxygen if necessary.

Obtain medical assistance if breathing remains difficult.

**Hydrogen sulphide (H<sub>2</sub>S), sulphur dioxide (SO<sub>2</sub>)**

If there is any suspicion of inhalation of H<sub>2</sub>S (hydrogen sulphide):

Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.

Remove casualty to fresh air as quickly as possible.

Immediately begin artificial respiration if breathing has ceased.

Provision of oxygen may help.

Obtain medical advice for further treatment.

**After skin contact:**

Remove contaminated clothing, contaminated footwear and dispose of safely.

Wash with water and a neutral soap.

Never use gasoline, kerosene or other solvents for washing of contaminated skin.

Seek medical attention if skin irritation, swelling or redness develops and persists.

When using high-pressure equipment, injection of product can occur.

If high-pressure injuries occur, immediately seek professional medical attention.

Do not wait for symptoms to develop.

**Hot product**

For minor thermal burns, cool the burn.

Hold the burned area under cold running water for at least five minutes, or until the pain subsides.

Body hypothermia must be avoided.

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Do not put ice on the burn.

DO NOT attempt to remove portions of clothing glued to burnt skin but cut round them

Seek medical attention in all cases of serious burns.

**After eye contact:**

Immediately rinse opened eyes for several minutes under running water keeping eyelids apart.

Remove contact lenses, if present and easy to do so.

If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.

**Hot product**

In case of eye contact with hot product, flood with water to dissipate heat.

Immediately obtain specialist medical assessment and treatment for the casualty.

**After swallowing:**

In case of ingestion, always assume that aspiration has occurred.

Except as a deliberate act, the ingestion of product is unlikely. If ingestion occurs, do not induce vomiting and SEEK MEDICAL CARE IMMEDIATELY.

Do not give anything by mouth to an unconscious person.

**4.2 Most important symptoms and effects, both acute and delayed**Exposure routes:**Skin:**

Dry skin, irritation in case of repeated or prolonged exposure.

May cause burn in case of contact of product at high temperature.

High pressure injection under the skin may cause serious damage to the underlying tissues even though no symptoms or injury may be apparent.

**Eyes:**

Slight irritation.

May cause burn in case of contact with product at high temperature.

**Ingestion:** Few or no symptoms expected. If any, nausea and diarrhoea might occur.

**4.3 Indication of any immediate medical attention and special treatment needed**

In case of ingestion, always assume that aspiration has occurred.

Aspiration of liquid into the lungs may cause chemical pneumonia.

**DO NOT INDUCE VOMITING**

The victim should be sent to the hospital immediately.

Hydrogen Sulphide: even moderate concentrations of this gas will rapidly paralyse the sense of smell and this warning sign may be rapidly lost; it is an irritant and asphyxiant.

High pressure injection under the skin may cause serious damage to the underlying tissues even though no symptoms or injury may be apparent.

**SECTION 5: Firefighting measures****5.1 Extinguishing media****Suitable extinguishing agents:**

Foam (trained personnel only)

Water fog (trained personnel only)

Other inert gases (subject to regulations)

Carbon dioxide

CO<sub>2</sub>, powder, foam or water spray.

Dry chemical powder

Sand or earth

**For safety reasons unsuitable extinguishing agents:**

Do not use direct water jets on the burning product:

they could cause splattering and spread the fire.

Water jet.

Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

**5.2 Special hazards arising from the substance or mixture**

Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide, H<sub>2</sub>S, SO<sub>x</sub> (sulfur oxides) or sulfuric acid and unidentified organic and inorganic compounds.

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For related properties, see section 9.

**5.3 Advice for firefighters****Protective equipment:**

Wear self-contained respiratory protective device:  
In case of a large fire or where there is a risk of oxygen deficiency.

Wear fully protective suit:

In case of a large fire.

Mouth respiratory protective device:

In case of a small fire.

**Additional information**

Cool endangered receptacles with water fog.

Avoid and control the spill if there is no risk.

People involved in the operation must be kept away from tanks and stay on the windward side.

Keep unnecessary people away of the place.

Collect contaminated fire fighting water separately. It must not enter the sewage system.

Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

**SECTION 6: Accidental release measures****General information**

Stop or contain leak at the source, if safe to do so.

Avoid direct contact with released material

Stay upwind

In case of large spillages, alert occupants in downwind areas.

Keep non-involved personnel away from the area of spillage. Alert emergency personnel

Except in case of small spillages,

the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.

Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares)

When the presence of dangerous amounts of H<sub>2</sub>S around the spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training.

If required, notify relevant authorities according to all applicable regulations

**6.1 Personal precautions, protective equipment and emergency procedures**

Small spillages: normal antistatic working clothes are usually adequate.

Large spillages: full body suit of chemically resistant and antistatic material, if necessary heat resistant and insulated

Gloves made of PVA are not water-resistant, and are not suitable for emergency use

Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons.

If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated

Work helmet. Antistatic non-skid safety shoes or boots, if necessary heat-resistant.

Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated.

A half or full-face respirator with filter(s) for organic vapours/H<sub>2</sub>S, or a Self-contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

**6.2 Environmental precautions:**

Prevent seepage into sewage system, workpits and cellars.

Inform respective authorities in case of seepage into water course or sewage system.

In case of spillages on public ways, warn the Authorities.

In case of spillage in the sea or navigable watercourses, alert Authorities and other ships.

**6.3 Methods and material for containment and cleaning up:**

Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions.

**On land:**

Prevent product from entering sewers, rivers or other bodies of water, or underground spaces (tunnels, cellars, etc.).

If necessary dike the product with dry earth, sand or similar non-combustible materials.

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Let hot product cool down naturally  
Large spillages may be cautiously covered with foam, if available, to limit fire risk  
Do not use direct jets  
Absorb spilled product with suitable non-combustible materials.  
Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal.  
In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.  
Transfer collected product and other contaminated materials to suitable containers for recovery or safe disposal.

**Fresh water or sea water:**

Small spillages:

In case of small spillages in closed waters (i.e. ports),  
contain product with floating barriers or other equipment.

Collect spilled product by absorbing with specific floating absorbents

If possible, large spillages in open waters should be contained with floating barriers or other mechanical means.

Large spillages:

If this not possible, control the spreading of the spillage, and collect the product by skimming or other suitable mechanical means.

The use of dispersants should be advised by an expert, and, if required, approved by local authorities

Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal.

**6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

**SECTION 7: Handling and storage****General information**

Obtain special instructions before use

A specific assessment of inhalation risks from the presence of H<sub>2</sub>S in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases must be made to help determine controls appropriate to local circumstances.

For more information regarding protective equipment and operational conditions see Exposure scenarios

**7.1 Precautions for safe handling**

Ensure good ventilation/exhaustion at the workplace.

Avoid formation and inhalation of vapours, fumes and mists.

Precautions should be taken to avoid skin burns when handling hot product.

Use adequate personal protective equipment as required.

Do not eat, drink or smoke while using this product.

Change contaminated clothes at the end of working shift

Keep away from food and beverages.

Exposure control: see chapter 8.

**Information about fire - and explosion protection:**

Keep ignition sources away - Do not smoke.

Take precautionary measures against static electricity.

Ground/bond containers, tanks and transfer/receiving equipment.

Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.

Do not accumulate materials impregnated with the product on the workplace.

**7.2 Requirements to be met by storerooms and receptacles:**

Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation.

Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.

Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.

Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulphide (H<sub>2</sub>S) and flammability.

**Recommended material**

For containers, or container linings use materials specifically approved for use with this product.

Recommended materials for containers, or container linings use mild steel, stainless steel.

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Compatibility should be checked with the manufacturer.

**Unsuitable materials**

Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use.

Compatibility should be checked with the manufacturer.

**Information about storage in one common storage facility:**

Do not store together with oxidizing agents.

**Further information about storage conditions:**

Keep only in the original container or in a suitable container for this kind of product.

Keep containers tightly closed and properly labelled.

Use and store only outdoors or in a well-ventilated area.

**7.3 Specific end use(s)** See Chapter 1.**SECTION 8: Exposure controls/personal protection****8.1 Control parameters****Ingredients with limit values that require monitoring at the workplace:**

see data for components.

**68334-30-5 Fuels, diesel**

VLE (Portugal)	Long-term value: 100 mg/m <sup>3</sup> P; A3; dermatose
TLV (USA)	Long-term value: 100* mg/m <sup>3</sup> as total hydrocarbons;Skin;*inh. fraction + vapor

**Mineral oil**

TLV (Portugal)	Long-term value: 5 (névoas) mg/m <sup>3</sup> I (fracção inalável), NP 1796/2014
TLV (USA)	Long-term value: 5 (mists) mg/m <sup>3</sup> I (inhalable fraction), ACGIH

**7783-06-4 hydrogen sulphide**

WEL (Great Britain)	Short-term value: 14 mg/m <sup>3</sup> , 10 ppm Long-term value: 7 mg/m <sup>3</sup> , 5 ppm
VLE (Portugal)	Short-term value: (15) ppm Long-term value: (10) ppm
PEL (USA)	Ceiling limit: 20; 50* ppm *10-min peak; once per 8-hr shift
REL (USA)	Ceiling limit: 15* mg/m <sup>3</sup> , 10* ppm *10-min
TLV (USA)	Short-term value: 7 mg/m <sup>3</sup> , 5 ppm Long-term value: 1.4 mg/m <sup>3</sup> , 1 ppm

**DNELs****Heavy Fuel Oil Components Category**

Oral	DNEL (longo prazo/long-term - sistémico/systemic)	0.015 mg/kg/24h (population)
Dermal	DNEL (longo prazo/long-term - sistémico/systemic)	0.065 mg/kg/8h (worker)
Inhalative	DNEL (agudo/acute - sistémico/systemic)	4700 mg/m <sup>3</sup> /15 min (worker)
	DNEL (longo prazo/long-term - sistémico/systemic)	0.12 mg/m <sup>3</sup> /8h (worker)

**vacuum gasoils, hydrocracked gasoils and distillate fuels category**

Dermal	DNEL (longo prazo/long term - sistémico/systemic)	1.3 mg/kg bw/24h (population)
	DNEL (longo prazo/long-term - sistémico/systemic)	2.9 mg/kg/8h (worker)
Inhalative	DNEL (agudo/acute - sistémico/systemic)	2600 mg/m <sup>3</sup> /15 min (population)
		4300 mg/m <sup>3</sup> /15 min (worker)
	DNEL (longo prazo/long-term - sistémico/systemic)	20 mg/m <sup>3</sup> /24h (population) (aerosol)
		68 mg/m <sup>3</sup> /8h (worker) (aerosol)
Inhalative	DNEL (longo prazo/long-term - sistémico/systemic)	68 mg/m <sup>3</sup> /8h (worker) (aerosol)



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**Trade name: ISO F RME 180****PNECs****Heavy Fuel Oil Components Category**

Oral PNEC oral 66.7 mg/kg (-)

**8.2 Exposure controls****Personal protective equipment:****General protective and hygienic measures:**

Guarantee suitable ventilation at workplaces.

Store protective clothing separately.

Do not carry product impregnated cleaning clothes in trouser pockets.

Wash hands before breaks and at the end of work.

Do not eat or drink while working.

Keep away from foodstuffs, beverages and feed.

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

**Respiratory protection:**

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.

Check with respiratory protective equipment suppliers.

Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.

Select a filter suitable for organic gases and vapours (e.g. EN14387).

**Protection of hands:**

Wear protective gloves.

In case of contact with hot product, gloves should be heat-resistant and thermally insulated

Gloves must comply with the relevant standards (e.g. EN374)

Gloves must be periodically inspected to detect wearing, perforations or contaminations.

**Material of gloves**

The glove material has to be impermeable and resistant to the product.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

**Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

**Eye protection:**

Wear a safety visor or goggles whenever the projection of the product is expected.

Chemical goggles should be consistent with EN 166 or equivalent.

**Body protection:**

Wear protective suit.

Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).

Thermal hazards: when handling heated product, wear heat resistant gloves, safety hat with visor, and heat resistant coveralls (with cuffs over gloves and legs over boots), and heavy-duty boots, e.g. leather for heat resistance.

**Limitation and supervision of exposure into the environment**

Handle and store according to regulations and applicable good practices.

Dispose according to the legislation in force.

**Risk management measures** See EXPOSURE SCENARIOS (annex).





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## SECTION 9: Physical and chemical properties

## 9.1 Information on basic physical and chemical properties

## General Information

Data in this section intends to describe the main properties for safety in storage, handling and use of the product. They should not be understood as product specifications.

## Appearance:

## Form:

Liquid

## Colour:

Dark brown/black

## Odour:

Mineral-oil-like

## Odour threshold:

Not determined.

## pH-value:

Not applicable because it is not an aqueous medium.

## Change in condition

## Melting point/Melting range:

Data from Chemical Safety Report - REACH Registration Dossier for Heavy Fuel Oil Components:  
< 30° C

Data from Chemical Safety Report - REACH Registration Dossier for Gas oils cat II (Vacuum gas oils, Hydrocracked gas oils and Distillate fuels):  
-40 - +6 °C

## Boiling point/Boiling range:

Data from Chemical Safety Report - REACH Registration Dossier for Heavy Fuel Oil Components:  
141 - 462°C

Data from Chemical Safety Report - REACH Registration Dossier for Gas oils cat II (Vacuum gas oils, Hydrocracked gas oils and Distillate fuels):  
220 ->750°C

## Pour point

30 (max) °C

## Flash point:

&gt;60 °C

## Flammability (solid, gaseous):

Not applicable.

## Decomposition temperature:

see Section 10.

## Self-igniting:

Data from Chemical Safety Report - REACH Registration Dossier for Heavy Fuel Oil Components:  
220°C - 550°C

Data from Chemical Safety Report - REACH Registration Dossier for Gas oils cat II (Vacuum gas oils, Hydrocracked gas oils and Distillate fuels):  
> 225°C

## Danger of explosion:

The product does not explode.  
Formation of explosive air/vapour mixtures is possible.

## Explosion limits:

## Lower:

Not determined.

## Upper:

Not determined.

## Vapour pressure:

Not determined.

## Density:

## Density at 15°C

0.991 (max) g/cm<sup>3</sup>

## Vapour density

Not determined.

## Evaporation rate

Not determined.

## Solubility in / Miscibility with water:

Practically immiscible.

## Partition coefficient (n-octanol/water):

Not determined

## Viscosity:

## Kinematic viscosity at 50°C

180 (max) mm<sup>2</sup>/s

## Oxidising properties

A study does not need to be conducted as the substance is incapable of reacting exothermically with combustible materials on the basis of its chemical structure.

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**Trade name: ISO F RME 180****9.2 Other information**

No further relevant information available.

**SECTION 10: Stability and reactivity****10.1 Reactivity** See section 10.3.**10.2 Chemical stability** The product is stable.**10.3 Possibility of hazardous reactions** Dangerous reactions with strong oxidizing agents.**10.4 Conditions to avoid** Protect from ignition sources.**10.5 Incompatible materials:** Strong oxidizing agents.**10.6 Hazardous decomposition products:**Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide, H<sub>2</sub>S, SO<sub>x</sub> (sulfur oxides) or sulfuric acid and unidentified organic and inorganic compounds.**SECTION 11: Toxicological information****11.1 Information on toxicological effects****Acute toxicity:****LD/LC50 values relevant for classification:****Heavy Fuel Oil Components Category**

Oral	LD50	> 4320 ml/kg bw (rat) (OECD Guideline 401 (equivalente/similar))
Dermal	LD50	> 2000 ml/kg bw (rabbit) (OECD Technical Guideline 434 (equivalent/similar))
Inhalative	LC50	4100 mg/m <sup>3</sup> (rat) (EPA OTS 798.1150 (equivalent/similar))

**vacuum gasoils, hydrocracked gasoils and distillate fuels category**

Oral	LD50	> 2000 mg/kg bw (rat) (OECD Guideline 401)
Dermal	LD50	> 5000 ml/kg bw (rabbit) (OECD Guideline 434)
Inhalative	LC50	4.1 mg/l (rat) (OECD Guideline 403)

**Primary irritant effect:****on the skin:**Moderately irritating to skin.  
Not classified as irritant.**on the eyes:**Appear to cause no more than transient, fully reversible eye irritation.  
Not classified as irritant.**by inhalation:**Harmful by inhalation.  
Hydrogen sulphide may be released (very toxic/asphyxiating gas).  
Irritation of the respiratory tract due to excess fume, mists or vapour exposure.**by ingestion:**Few or no symptoms expected. If any, nausea and diarrhoea might occur.  
Not classified.**Aspiration:**

In case of vomiting, the aspiration of liquid into the lungs may occur, which may lead rapidly to development of chemical pneumonia.

**Additional toxicological information:**Harmful  
Carcinogenic.**Toxicokinetics, metabolism and distribution** No experimental data were located.**Acute effects (acute toxicity, irritation and corrosivity)** No corrosive action is expected.

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### Sensitisation

Dermal sensitisation:

Not a sensitizer.

Respiratory sensitisation:

Not expected to cause respiratory sensitisation.

### Repeated dose toxicity

Data from Chemical Safety Report - REACH Registration Dossier for Heavy Fuel Oil Components:  
There is evidence to indicate that Heavy Fuel Oil Components have a potential to cause systemic alterations following repeated dermal exposure.

Changes in haematological and clinical chemistry parameters and organ weights were recorded after treatment with substances of this group of substances. In general, alterations in serum cholesterol and blood urea nitrogen were recorded following administration of higher dermal doses accompanied by red cell, platelet, liver and thymus effects at lower treatments levels.

Data from Chemical Safety Report - REACH Registration Dossier for Gasoils cat II (Vacuum gasoils, Hydrocracked gasoils and Distillate fuels):

Inhalation:

NOAEC=750 mg/m<sup>3</sup> - local effects - lung

NOAEC<1710mg/m<sup>3</sup> - systemic effects

Dermal:

NOAEL=30 mg/kg bw/d - subchronic toxicity

### CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)

Carc. 1B, Repr. 2

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Aquatic toxicity:

Very toxic to aquatic organisms.

Very toxic to aquatic life with long lasting effects.

#### Acute toxicity - short term

##### Heavy Fuel Oil Components Category

EL50/48h	2 mg/l (daphnia magna) (OECD Technical Guideline 202, static)
EL50/72h	0.75 mg/l (pseudokirchnerella subcapitata) (OECD Guideline 201, static, growth rate)
	0-0.4 mg/l (pseudokirchnerella subcapitata) (OECD Guideline 201, static, biomass)
LL50/96h	79 mg/l (oncorhynchus mykiss) (OECD Guideline 203, semi-static)

##### vacuum gasoils, hydrocracked gasoils and distillate fuels category

EL50/48h	68 mg/l (daphnia magna) (OECD Guideline 202)
ELr50/72h	22 mg/l (raphidocelis subcapitata) (OECD Guideline 201)
LL50/96h	21 mg/l (oncorhynchus mykiss) (OECD Guideline 203)

#### Chronic toxicity - long term

##### Heavy Fuel Oil Components Category

NOEL/21d	0.27 mg/l (daphnia magna) (QSAR model)
NOEL/28d	0.1 mg/l (oncorhynchus mykiss) (QSAR model)

##### vacuum gasoils, hydrocracked gasoils and distillate fuels category

NOEL/21d	0.2 mg/l (daphnia magna) (Petrotox model)
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#### Microbiological activity in sewage treatment systems

Heavy Fuel Oils Components Category

LL50 (72h)= 1000 mg/l (Tetrahymena pyriformis) (Petrotox Model)

NOEL (72h)= 14,91 mg/l (Tetrahymena pyriformis) - growth inhibition (Petrotox Model)

Gasoils cat II (Vacuum gasoils, Hydrocracked gasoils and Distillate fuels):

EL50 (40h): >1000 mg/l (growth inhibition)

NOEL (40h): 3.217 mg/l (growth inhibition)

**Classification:** Toxic to aquatic life with long lasting effects.

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**Trade name: ISO F RME 180****12.2 Persistence and degradability**

Low potential to hydrolyse in the aquatic environment. This degradative process will not contribute to the removal from the environment.

The product does not have the potential to undergo photolysis in water and soil, and this fate process will not contribute to a measurable degradative loss of the product from the environment.

Some structures meet the Persistent (P) or very Persistent (vP) criteria.

**Behaviour in environmental systems:****Components:**

Heavy Fuel Oils Components Category

Distribution (%):

air: 4,55

water: 0,01

soil: 67,81

sediments: 27,63

biota: < 0,1

aerosol: < 0,1

Gas oils cat II (Vacuum gas oils, Hydrocracked gas oils and Distillate fuels):

Distribution in environmental compartments %:

air: 24,36

water: 0,14

sediments: 62,86

soil: 12,64

**12.3 Bioaccumulative potential**

Some components are expected to have potential to bioaccumulate.

No structures meet the very Bioaccumulative (vB) criterion but some structures meet the Bioaccumulative (B) criterion

**12.4 Mobility in soil** No further relevant information available.

**General notes:**

Water hazard class 3 (German Regulation) (Self-assessment): extremely hazardous for water

Do not allow product to reach ground water, water course or sewage system, even in small quantities.

Danger to drinking water if even extremely small quantities leak into the ground.

**12.5 Results of PBT and vPvB assessment**

**PBT:** The substance does not meet PBT criteria.

**vPvB:** The substance does not meet the vPvB criteria.

**12.6 Other adverse effects** No further relevant information available.

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods** The residues of this product should be treated as hazardous waste.

**Product:**

The generation of waste should be avoided or minimised wherever possible.

Waste product residues should not be disposed of via the foul sewer.

Product surpluses must be disposed according to legislation in force in authorised plants.

Don't allow wastes to spoil the soil, the water or be released in the environment.

Disposal of this product should at all times comply with the requirements of environmental protection and waste disposal legislation.

**Recommendation**

Product surpluses must be disposed according to legislation in force in authorised plants.

Don't allow wastes to spoil the soil, the water or be released in the environment.

**European waste catalogue**

13 07 01 (\*) fuel oil and diesel

These codes can be given only as a suggestion, according to the original composition of the product, and its intended (foreseeable) use(s).

The final user has the responsibility for the attribution of the most suitable code, according to the actual use(s) of the material, contaminations or alterations.

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**Trade name: ISO F RME 180**

### Uncleaned packaging:

Packaging containing residues of or contaminated by dangerous substances: code for the waste 15 01 10\*  
Contaminated packages must be disposed according to legislation in force in authorised plants.  
Disposal of this product should at all times comply with the requirements of environmental protection and waste disposal legislation.  
Recycle if possible.

### Recommendation:

Contaminated packages must be disposed according to legislation in force in authorised plants.

## SECTION 14: Transport information

### 14.1 UN-Number

ADR, IATA  
IMDG

UN3082  
Void

### 14.2 UN proper shipping name

ADR

3082 ENVIRONMENTALLY HAZARDOUS  
SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual,  
DIESEL FUEL)

IMDG  
IATA

Void  
ENVIRONMENTALLY HAZARDOUS SUBSTANCE,  
LIQUID, N.O.S. (Fuel oil, residual, DIESEL FUEL)

### 14.3 Transport hazard class(es)

ADR



Class

9 (M6) Miscellaneous dangerous substances and  
articles.

Label

9

IMDG

Class

Void

IATA



Class

9 Miscellaneous dangerous substances and  
articles.

Label

9

### 14.4 Packing group

ADR, IATA  
IMDG

III  
Void

### 14.5 Environmental hazards:

Marine pollutant:

No

Special marking (ADR):

Symbol (fish and tree)

Special marking (IATA):

Symbol (fish and tree)

### 14.6 Special precautions for user

Warning: Miscellaneous dangerous substances and  
articles.

Danger code (Kemler):

90



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Trade name: ISO F RME 180

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

**Transport/Additional information:**

Marpol Annex 1 rules apply for bulk shipments by sea.

**ADR****Limited quantities (LQ)  
Excepted quantities (EQ)**

5L

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

**Transport category  
Tunnel restriction code  
Remarks:**

3

E

When the product has a flash point &gt; 60°C and is transported at or above its flash-point:

ADR/RID class: 3 (F2) Flammable liquids

Danger code (Kemler): 30

UN-Number: 3256

Packaging group III

Hazard label: 3

Special marking: Symbol (fish and tree)

UN proper shipping name: 3256 ELEVATED

TEMPERATURE LIQUID, FLAMMABLE,

N.O.S (Fuels, diesel and Fuel oil, residual)

Limited quantities (LQ): LQ0

Transport category: 3

Tunnel restriction code: D/E

**IMDG****Remarks:**

When the product has a flash point &gt; 60°C and is transported at or above its flash-point:

IMDG class: 3

UN Number: 3256

Label: 3

Packaging group: III

EMS Number: F-E,S-D

Proper shipping name: ELEVATED

TEMPERATURE LIQUID, FLAMMABLE,

N.O.S. (Fuels, diesel and Fuel oil, residual)

**IATA****Remarks:**

UN 3256 ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.

The substance is forbidden on cargo aircraft.

The substance is forbidden on passenger and cargo aircraft.

**UN "Model Regulation":**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuel oil, residual, DIESEL FUEL), 9, III

**This product is being carried under the scope of MARPOL Annex I (for marine transportation)**

Yes

**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****USA: TSCA (Toxic Substances Control Act)**

68476-33-5 Fuel oil, residual

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**Trade name: ISO F RME 180**

68334-30-5	Fuels, diesel
<b>Canada: DSL - Canadian Domestic Substances List</b>	
68476-33-5	Fuel oil, residual
68334-30-5	Fuels, diesel
<b>Philippines Inventory of Chemicals and Chemical Substances</b>	
68334-30-5	Fuels, diesel
<b>Chinese Chemical Inventory of Existing Chemical Substances (IECSC)</b>	
68476-33-5	Fuel oil, residual
68334-30-5	Fuels, diesel
<b>Australian Inventory of Chemical Substances (AICS)</b>	
68476-33-5	Fuel oil, residual
68334-30-5	Fuels, diesel
<b>Korean Existing Chemical Inventory (KECL)</b>	
68334-30-5	Fuels, diesel
	KE-17286
<b>European Union: EINECS (European Inventory of Existing Commercial chemical Substances)</b>	
68476-33-5	Fuel oil, residual
68334-30-5	Fuels, diesel

### 15.2 Chemical safety assessment:

A Chemical Safety Assessment has been carried out for the components.

## SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.  
This document contains relevant information to guarantee safety in storage, handling and use of this product. It must be made available and explained to the workers involved and to safety supervisors.

### Relevant phrases

- H226 Flammable liquid and vapour.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H332 Harmful if inhaled.
- H350 May cause cancer.
- H351 Suspected of causing 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.
- H410 Very toxic to aquatic life with long lasting effects.
- H411 Toxic to aquatic life with long lasting effects.
- R20 Harmful by inhalation.
- R38 Irritating to skin.
- R40 Limited evidence of a carcinogenic effect.
- R45 May cause cancer.
- R48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
- R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- R63 Possible risk of harm to the unborn child.
- R65 Harmful: may cause lung damage if swallowed.
- R66 Repeated exposure may cause skin dryness or cracking.

### Exposure Scenarios

Industrial use:

\* Manufacture of the substance.



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**Trade name: ISO F RME 180**

- \* Formulation & (re)packing of substances and mixtures.
- \* Distribution of the substance.
- \* Use as a fuel.

Professional use:

- \* Use as a fuel.

**Department issuing MSDS:**

Galp Energia - Petróleos de Portugal, Petrogal, S.A. - R&D - DPT - GIM - Qualidade e Segurança de Produtos

Rua da Fonseca, Torre C, 1600-209 Lisboa, Portugal

Tel.: +351 21 724 25 00

**Legend:**

n.a.: not available

n.d.: not determined

ca.: approximately

**Abbreviations and acronyms:**

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

ICAO: International Civil Aviation Organisation

ICAO-TI: Technical Instructions by the "International Civil Aviation Organisation" (ICAO)

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

LD50: Lethal dose, 50 percent

Flam. Liq. 3: Flammable liquids, Hazard Category 3

Acute Tox. 4: Acute toxicity, Hazard Category 4

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2

Carc. 1B: Carcinogenicity, Hazard Category 1B

Carc. 2: Carcinogenicity, Hazard Category 2

Repr. 2: Reproductive toxicity, Hazard Category 2

STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2

Asp. Tox. 1: Aspiration hazard, Hazard Category 1

Aquatic Acute 1: Hazardous to the aquatic environment - Acute Hazard, Category 1

Aquatic Chronic 1: Hazardous to the aquatic environment - Chronic Hazard, Category 1

Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2

**Sources:**

Chemical Safety Report (REACH) for Heavy Fuel Oil Components Category.

REACH - Chemical Safety Report

Hazard classification and labelling of petroleum substances in the European Economic Area - 2014.

Concawe, October 2014.

Technical literature.

**\* Data compared to the previous version altered.**

Relevant modifications have been made in sections and exposure scenarios marked with (\*).

Revisions introduced the exposure scenarios:

New exposure Scenarios added.

**MATERIAL SAFETY DATA SHEET ANNE**  
**EXPOSURE SCENARIOS APPLICABLE TO THE SUBSTANCES**  
**CAS# 68476-33-5 E CAS# 68334-30-5**

**Industrial use:**

- \* Manufacture of the substance.
- \* Distribution of the substance
- \* Formulation & (re)packing of substances and mixtures.
- \* Use as a fuel.

**Professional use:**

- \* Use as a fuel.



**EXPOSURE SCENARIOS APPLICABLE TO THE  
SUBSTANCE CAS# 68476-33-5**

<b>Section 1</b>	<b>Exposure Scenario</b>
<b>Scenario title</b>	<b>Manufacture of substance - Industrial</b>
<b>Use descriptors</b>	
<b>Sector(s) of Use</b>	3, 8, 9
<b>Process Category(ies)</b>	1, 2, 3, 8a, 8b, 15
<b>Environmental Release Category(ies)</b>	1
<b>Specific Environmental Release Category(ies)</b>	ESVOC SpERC 1.1.v1
<b>Processes, tasks, activities covered</b>	Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)
<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product Characteristics</b>	
<b>Physical form of product</b>	Liquid, vapour pressure < 0.5 kPa at STP - OC3.
<b>Concentration of substance in product</b>	Covers percentage substance in the product up to 100 % (unless stated differently) - G13.
<b>Amount used</b>	Not applicable.
<b>Frequency and duration of use/exposure</b>	Covers daily exposures up to 8 hours (unless stated differently) - G2.
<b>Human factors not influenced by risk management</b>	Not applicable.
<b>Other operational conditions of use affecting environmental exposure</b>	Operation is carried out at elevated temperature (> 20°C above ambient temperature) - OC7. Assumes a good basic standard of occupational hygiene is implemented - G1.
<b>Contributing Scenarios</b>	
<b>General measures (carcinogens) - G18.</b>	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 scenarios; clear up spills immediately and dispose of wastes 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 - G20.
<b>General exposures (closed systems) - CS15.</b>	Handle substance within a closed system - E47. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
<b>Process sampling - CS2. Outdoor - OC9.</b>	Sample via a closed loop or other system to avoid exposure - E8. Avoid carrying out activities involving exposure for more than 15 minutes - OC26. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
<b>Bulk product storage - CS85.</b>	Store substance within a closed system - E84. Avoid carrying out activities involving exposure for more than 4 hours - OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
<b>Laboratory activities - CS36.</b>	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure - E12. Wear suitable gloves tested to EN374 - PPE15.
<b>Marine vessel/barge (un)loading- CS510</b>	Avoid carrying out activities involving exposure for more than 4 hours - OC28. Transfer via enclosed lines - E52. Clear transfer lines prior to de-coupling - E39. Retain drain downs in sealed storage pending disposal or for subsequent recycle - ENV4. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.

Scenario title		Manufacture of substance - Industrial	
Road tanker/rail car loading - CS511.		Ensure material transfers are under containment or extract ventilation - E66. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.	
Equipment cleaning and maintenance - CS39.		Drain down and flush system prior to equipment break-in or maintenance - E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training - PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle - ENVT4.	
Section 2.2		Control of environmental exposure	
Product characteristics			
Substance is complex UVCB - PrC3.			
Predominantly hydrophobic - PrC4.			
Amounts used			
Fraction of EU tonnage used in region: - A1		0,1	
Regional use tonnage (tonnes/year): - A2		1,10E+07	
Fraction of Regional tonnage used locally: - A3		5,20E-02	
Annual site tonnage (tonnes/year): - A5		6,00E+05	
Maximum daily site tonnage (kg/day): - A4		2,00E+06	
Frequency and duration of use			
Continuous release - FD2.			
Emission Days (days/year): - FD4		300	
Environmental factors not influenced by risk management			
Local freshwater dilution factor:-EF1		10	
Local marine water dilution factor:-EF2		100	
Other given operational conditions affecting environmental exposure			
Release fraction to air from process (initial release prior to RMM): - OOC4		1,00E-04	
Release fraction to wastewater from process (initial release prior to RMM): - OOC5		3,00E-06	
Release fraction to soil from process (initial release prior to RMM): - OOC6		0,0001	
Technical conditions and measures at process (source)to prevent release			
Common practices vary across sites thus conservative process release estimates used - TCS1.			
Technical onsite conditions and measures to reduce or limit discharges, air emissions			
Risk from environmental exposure is driven by humans via indirect exposure - TCR1j.			
Onsite wastewater treatment required - TCR13.			
Prevent discharge of undissolved substance to or recover from onsite wastewater - TCR14.			
Treat air emission to provide the required removal efficiency of (%): - TCR7		90	

Scenario title		Manufacture of substance - Industrial
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): - TCR8	85,9	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): - TCR10	>=0	
<b>Organisation measures to prevent/limit release from site</b>		
Do not apply industrial sludge to natural soils - OMS2.		
Sludge should be incinerated, contained or reclaimed - OMS3.		
<b>Conditions and measures related to municipal sewage treatment plant</b>		
Estimated substance removal from wastewater via domestic sewage treatment (%): - STP3	88,8	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): - STP4	88,8	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): - STP6	2,30E+06	
Assumed domestic sewage treatment plant flow (m3/d): - STP5	10000	
<b>Conditions and measures related to external treatment of waste for disposal</b>		
During manufacturing no waste of the substance is generated to treat - ERW2.		
<b>Conditions and measures related to external recovery of waste</b>		
During manufacturing no waste of the substance is generated to recover - ERW2.		
<b>Section 3</b>		<b>Exposure estimation</b>
<b>3.1. Health</b>		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated - G21.		
<b>3.2. Environment</b>		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model - EE2.		
<b>Section 4</b>		<b>Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented - G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23. Available hazard data do not enable the derivation of a DNEL for carcinogenic effects - G33. Available hazard data do not support the need for a DNEL to be established for other health effects - G36. Risk Management Measures are based on qualitative risk characterisation - G37.		
<b>4.2. Environment</b>		
RCR (water) - max	9,90E-01	
RCR (air) - max	6,69E-02	
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 - DSU1. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination - DSU2. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination - DSU3. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) - DSU4. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file – “Site-Specific Production” worksheet - DSU6. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required DSU8.		

<b>Section 1</b>	<b>Exposure Scenario</b>
<b>Scenario title</b>	<b>Distribution of substance - Industrial</b>

<b>Use descriptors</b>	
<b>Sector(s) of Use</b>	3
<b>Process Category(ies)</b>	1, 2, 3, 8a, 8b,15
<b>Environmental Release Category(ies)</b>	4, 5, 6a, 6b, 6c, 6d, 7
<b>Specific Environmental Release Category(ies)</b>	ESVOC SpERC 1.1b.v1
<b>Processes, tasks, activities covered</b>	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities
<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product Characteristics</b>	
<b>Physical form of product</b>	Liquid, vapour pressure < 0.5 kPa at STP-OC3
<b>Concentration of substance in product</b>	Covers percentage substance in the product up to 100 % (unless stated differently)-G13
<b>Frequency and duration of use</b>	Covers daily exposures up to 8 hours (unless stated differently)-G2
<b>Other operational conditions of use affecting environmental exposure</b>	Assumes use at not more than 20°C above ambient temperature, unless stated differently-G15 Assumes a good basic standard of occupational hygiene is implemented-G1
<b>Contributing Scenarios</b>	<b>Specific operational conditions and risk management measures</b>
<b>General measures (carcinogens-G18)</b>	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 scenarios; clear up spills immediately and dispose of wastes 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-G20
<b>Process sampling-CS2 Outdoor-OC9</b>	Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 15 minutes-OC26 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>General exposures (closed systems)-CS15</b>	Handle substance within a closed system-E47 Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Bulk product storage-CS85</b>	Store substance within a closed system-E84 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Product sampling-CS137</b>	Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 15 minutes-OC26 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Laboratory activities-CS36</b>	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure-E12 Wear suitable gloves tested to EN374-PPE15
<b>Marine vessel/barge (un)loading-CS510</b>	Transfer via enclosed lines-E52 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Clear transfer lines prior to de-coupling-E39 Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENV4 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Road tanker/rail car loading-CS511</b>	Ensure material transfers are under containment or extract ventilation-E66 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Equipment cleaning and maintenance-CS39</b>	Drain down and flush system prior to equipment break-in or maintenance-E55 Wear chemically resistant gloves (tested to EN374) in combination with specific activity training-PPE17 Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENV4
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	
Substance is complex UVCB-PrC3	
Predominantly hydrophobic-PrC4	



Scenario title		Distribution of substance - Industrial	
Amounts used			
Maximum daily site tonnage (kg/day):- A4		7,70E+04	
Frequency and duration of use			
Continuous release-FD2			
Emission Days (days/year): - FD4		300	
Environmental factors not influenced by risk management			
Local freshwater dilution factor:-EF1		10	
Local marine water dilution factor:- EF2		100	
Other given operational conditions affecting environmental exposure			
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):OOC11		1,E-04	
Release fraction to wastewater from process (initial release prior to RMM): - OOC5		1,E-07	
Release fraction to soil from process (initial release prior to RMM): - OOC6		1,E-05	
Technical conditions and measures at process (source)to prevent release			
Common practices vary across sites thus conservative process release estimates used-TCS1			
Technical onsite conditions and measures to reduce or limit discharges, air emissions			
Risk from environmental exposure is driven by humans via indirect exposure. No wastewater treatment required-TCR6			
Treat air emission to provide the required removal efficiency of (%):- TR17		90	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): TCR8		>=0	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): TCR10		>=0	
Organisation measures to prevent/limit release from site			
Do not apply industrial sludge to natural soils-OMS2 Sludge should be incinerated, contained or reclaimed-OMS3			
Conditions and measures related to municipal sewage treatment plant			
Estimated substance removal from wastewater via domestic sewage treatment (%): STP3		88,8	
Total efficiency of removal from		88,8	
Maximum allowable site tonnage		3,80E+03	
Assumed domestic sewage treatment		2000	
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			
Conditions and measures related to external recovery of waste			
External recovery and recycling of waste should comply with applicable local and/or national regulations-ERW1			
Section 3		Exposure estimation	
3.1. Health			

Scenario title		Distribution of substance - Industrial
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated-G21		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model-EE2		
Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented-G22 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23 Available hazard data do not enable the derivation of a DNEL for carcinogenic effects-G33 Available hazard data do not support the need for a DNEL to be established for other health effects-G36 Risk Management Measures are based on qualitative risk characterisation-G37		
4.2. Environment		
RCR (water) - max		1,71E-01
RCR (air) - max		2,92E-02
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-DSU1 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination-DSU2 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination-DSU3 Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> )-DSU4		

Section 1	Exposure Scenario
Scenario title	Formulation & (re)packing of substances and mixtures - Industrial
<b>Use descriptors</b>	
Sector(s) of Use	3, 10
Process Category(ies)	1, 2, 3, 8a, 8b,15
Environmental Release Category(ies)	2
Specific Environmental Release Category(ies)	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP-OC3
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)-G13
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)-G2
Other operational conditions of use affecting environmental exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently-G15
	Assumes a good basic standard of occupational hygiene is implemented-G1
<b>Contributing Scenarios</b>	<b>Specific operational conditions and risk management measures</b>
General measures (carcinogens-G18)	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 scenarios; clear up spills immediately and dispose of wastes 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-G20
General exposures (closed systems)-CS15 Process sampling-CS2	Handle substance within a closed system-E47 Sample via a closed loop or other system to avoid exposure - E8 Avoid carrying out activities involving exposure for more than 15 minutes-OC26 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
General exposures (closed systems)-CS15	Handle substance within a closed system-E47 Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
Bulk product storage-CS85	Store substance within a closed system-E84 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
Laboratory activities-CS36	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure-E12 Wear suitable gloves tested to EN374-PPE15
Product sampling-CS137	Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 15 minutes-OC26 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
Marine vessel/barge (un)loading-CS510	Transfer via enclosed lines-E52 Avoid carrying out activities involving exposure for more than 4 hours-OC28 Clear transfer lines prior to de-coupling-E39 Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENV4 Wear chemically resistant gloves (tested to EN374) in combination with 'basic'
Road tanker/rail car loading-CS511	Ensure material transfers are under containment or extract ventilation-E66 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
Drum/batch transfers-CS8	Ensure material transfers are under containment or extract ventilation-E66 OU Ensure operation is undertaken outdoors-E69 Avoid carrying out activities involving exposure for more than 1 hour-OC27 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
Equipment cleaning and maintenance-CS39	Drain down and flush system prior to equipment break-in or maintenance-E55 Wear chemically resistant gloves (tested to EN374) in combination with specific activity training-PPE17 Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENV4
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	
Substance is complex UVCB-PrC3	
Predominantly hydrophobic-PrC4	
<b>Amounts used</b>	
Maximum daily site tonnage (kg/day):-	1,00E+05
A4	

Scenario title	Formulation & (re)packing of substances and mixtures - Industrial	
Frequency and duration of use		
Continuous release-FD2		
Emission Days (days/year): - FD4	300	
Environmental factors not influenced by risk management		
Local freshwater dilution factor:-EF1	10	
Local marine water dilution factor:-EF2	100	
Other given operational conditions affecting environmental exposure		
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):OOC11	2,E-03	
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	5,E-06	
Release fraction to soil from process (initial release prior to RMM): - OOC6	1,E-04	
Technical conditions and measures at process (source)to prevent release		
Common practices vary across sites thus conservative process release estimates used-TCS1		
Technical onsite conditions and measures to reduce or limit discharges, air emissions		
Risk from environmental exposure is driven by humans via indirect exposure If discharging to domestic sewage treatment plant, no onsite wastewater treatment required-TCR9 Prevent discharge of undissolved substance to or recover from onsite wastewater-TCR14		
Treat air emission to provide the required removal efficiency of (%):-TR17	0	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): TCR8	>=54	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): TCR10	>=0	
Organisation measures to prevent/limit release from site		
Do not apply industrial sludge to natural soils-OMS2 Sludge should be incinerated, contained or reclaimed-OMS3		
Conditions and measures related to municipal sewage treatment plant		
Estimated substance removal from wastewater via domestic sewage treatment (%): STP3	88,8	
Total efficiency of removal from	88,8	
Maximum allowable site tonnage	1,10E+05	
Assumed domestic sewage treatment	2000	
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		
Conditions and measures related to external recovery of waste		
External recovery and recycling of waste should comply with applicable local and/or national regulations-ERW1		
Section 3	Exposure estimation	
3.1. Health		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated-G21		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model-EE2		
Section 4	Guidance to check compliance with the Exposure Scenario	
4.1. Health		

Scenario title	Formulation & (re)packing of substances and mixtures - Industrial
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented-G22 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23 Available hazard data do not enable the derivation of a DNEL for carcinogenic effects-G33 Available hazard data do not support the need for a DNEL to be established for other health effects-G36 Risk Management Measures are based on qualitative risk characterisation-G37</p>	
<b>4.2. Environment</b>	
RCR (water) - max	2,43E-01
RCR (air) - max	7,19 e-1
<p>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-DSU1 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination-DSU2 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination-DSU3 Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>)-DSU4</p>	

<b>Section 1</b>	<b>Exposure Scenario</b>
<b>Scenario title</b>	<b>Use as a fuel - Industrial</b>
<b>Use descriptors</b>	3
<b>Sector(s) of Use</b>	1, 2, 3, 8A, 8B, 16
<b>Process Category(ies)</b>	7
<b>Environmental Release Category(ies)</b>	ESVOC SpERC 7.12a.v1
<b>Specific Environmental Release Category(ies)</b>	
<b>Processes, tasks, activities covered</b>	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.
<b>Assessment method</b>	see Section 3
<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product Characteristics</b>	
<b>Physical form of product</b>	Liquid, vapour pressure < 0.5 kPa at STP-OC3
<b>Concentration of substance in product</b>	Covers percentage substance in the product up to 100 % (unless stated differently)-G13
<b>Frequency and duration of use</b>	Covers daily exposures up to 8 hours (unless stated differently)-G2
<b>Other operational conditions of use affecting environmental exposure</b>	Operation is carried out at elevated temperature (> 20°C above ambient temperature)-OC7
	Assumes a good basic standard of occupational hygiene is implemented-G1
<b>Contributing Scenarios</b>	<b>Specific operational conditions and risk management measures</b>
<b>General measures (carcinogens-G18)</b>	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 scenarios; clear up spills immediately and dispose of wastes 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-G20
<b>General exposures (closed systems)-CS15</b>	Handle substance within a closed system-E47. Sample via a closed loop or other system to avoid exposure-E8. Avoid carrying out activities involving exposure for more than 4 hours-OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>General exposures (closed systems)-CS15. Product sampling-CS137</b>	Handle substance within a closed system-E47. Use long handled brushes and rollers where possible. Avoid carrying out activities involving exposure for more than 1 hour-OC27. Provide a good standard of controlled ventilation (10 to 15 air changes per hour)-E40. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Bulk closed unloading- CS502. Outdoor-OC9</b>	Transfer via enclosed lines-E52. Avoid carrying out activities involving exposure for more than 4 hours-OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Drum/batch transfers-CS8</b>	Ensure material transfers are under containment or extract ventilation-E66 or: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)-E11. Avoid carrying out activities involving exposure for more than 1 hour-OC27. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Operation of solids filtering equipment- CS117</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)-E11. Avoid carrying out activities involving exposure for more than 4 hours-OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Bulk product storage-CS85</b>	Store substance within a closed system-E84. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)-E11. Avoid carrying out activities involving exposure for more than 4 hours-OC28. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Use as a fuel- GEST12_I (closed systems)-CS107</b>	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Equipment cleaning and maintenance-CS39</b>	Drain down and flush system prior to equipment break-in or maintenance-E55. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training-PPE17. Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENV4

Scenario title		Use as a fuel - Industrial
Section 2.2		Control of environmental exposure
Product characteristics		
Substance is complex UVCB-PrC3		
Predominantly hydrophobic-PrC4		
Amounts used		
Maximum daily site tonnage (kg/day):-A4	5,00E+06	
Frequency and duration of use		
Continuous release-FD2		
Emission Days (days/year): - FD4	365	
Environmental factors not influenced by risk management		
Local freshwater dilution factor:-EF1	10	
Local marine water dilution factor:-EF2	100	
Other given operational conditions affecting environmental exposure		
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):OOC11	7,00E-04	
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	4,40E-07	
Release fraction to soil from process (initial release prior to RMM): - OOC6	0,00E+00	
Technical conditions and measures at process (source)to prevent release		
Common practices vary across sites thus conservative process release estimates used-TCS1		
Technical onsite conditions and measures to reduce or limit discharges, air emissions		
Risk from environmental exposure is driven by freshwater sediment-TCR1b.Onsite wastewater treatment required- TCR13. Prevent discharge of undissolved substance to or recover from onsite wastewater-TCR14		
Treat air emission to provide the required removal efficiency of (%):-TR17	95	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): TCR8	>= 87,7	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): TCR10	>= 0	
Organisation measures to prevent/limit release from site		
Do not apply industrial sludge to natural soils-OMS2.		
Sludge should be incinerated, contained or reclaimed-OMS3		
Conditions and measures related to municipal sewage treatment plant		
Estimated substance removal from wastewater via domestic sewage treatment (%): STP3	88,8	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): STP4	88,8	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d STP6	5,20E+06	



Scenario title		Use as a fuel - Industrial
Assumed domestic sewage treatment plant flow (m3/d): STP5	2000	
Conditions and measures related to external treatment of waste for disposal		
Combustion emissions limited by required exhaust emission controls - ETW1. Combustion emissions considered in regional exposure assessment-ETW2		
Conditions and measures related to external recovery of waste		
This substance is consumed during use and no waste of the substance is generated - ERW3		
Section 3		Exposure estimation
3.1. Health		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated-G21		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model-EE2		
Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented-G22 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23 Available hazard data do not enable the derivation of a DNEL for carcinogenic effects-G33 Available hazard data do not support the need for a DNEL to be established for other health effects-G36 Risk Management Measures are based on qualitative risk characterisation-G37		
4.2. Environment		
RCR (water) - max	9,09E-01	
RCR (air) - max	5,73E-01	
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-DSU1 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination-DSU2 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination-DSU3 Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> )-DSU4		

<b>Section 1</b>	<b>Exposure Scenario</b>
<b>Scenario title</b>	<b>Use as a fuel - Professional</b>
<b>Use descriptors</b>	
<b>Sector(s) of Use</b>	22
<b>Process Category(ies)</b>	1, 2, 3, 8a, 8b, 16
<b>Environmental Release Category(ies)</b>	9a, 9b
<b>Specific Environmental Release Category(ies)</b>	ESVOC SpERC 9.12a.v1
<b>Processes, tasks, activities covered</b>	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.
<b>Assessment method</b>	see Section3
<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product Characteristics</b>	
<b>Physical form of product</b>	Liquid, vapour pressure < 0.5 kPa at STP-OC3
<b>Concentration of substance in product</b>	Covers percentage substance in the product up to 100 % (unless stated differently)-G13
<b>Frequency and duration of use</b>	Covers daily exposures up to 8 hours (unless stated differently)-G2
<b>Other operational conditions of use affecting environmental exposure</b>	Operation is carried out at elevated temperature (> 20°C above ambient temperature)-OC7 Assumes a good basic standard of occupational hygiene is implemented-G1
<b>Contributing Scenarios</b>	<b>Specific operational conditions and risk management measures</b>
<b>General measures (carcinogens-G18)</b>	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 scenarios; clear up spills immediately and dispose of wastes 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-G20
<b>General exposures (closed systems)-CS15 Product sampling-CS137</b>	Handle substance within a closed system-E47. Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 1 hour-OC27 Provide a good standard of controlled ventilation (10 to 15 air changes per hour)-E40 Wear chemically resistant gloves (tested to EN374) in combination with specific activity training-PPE17
<b>General exposures (closed systems)-CS15</b>	Handle substance within a closed system-E47. Sample via a closed loop or other system to avoid exposure-E8 Avoid carrying out activities involving exposure for more than 1 hour-OC27 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Bulk closed unloading- CS502</b>	Provide a good standard of controlled ventilation (10 to 15 air changes per hour)-E40 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16 Avoid carrying out activities involving exposure for more than 1 hour-OC27, or Ensure material transfers are under containment or extract ventilation-E66
<b>Drum/batch transfers-CS8</b>	Provide a good standard of controlled ventilation (10 to 15 air changes per hour)-E40 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16 Avoid carrying out activities involving exposure for more than 1 hour-OC27, or: Ensure material transfers are under containment or extract ventilation-E66
<b>Refuelling-CS507</b>	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16 Avoid carrying out activities involving exposure for more than 1 hour-OC27,
<b>Use as a fuel- GEST12_I (closed systems)-CS107</b>	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training-PPE16
<b>Equipment cleaning and maintenance-CS39</b>	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)-E11. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training-PPE17 Drain down system prior to equipment break-in or maintenance-E65 Retain drain downs in sealed storage pending disposal or for subsequent recycle-ENVT4 Clear spills immediately-C&H13
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	
<b>Substance is complex UVCB-PrC3</b>	
<b>Predominantly hydrophobic-PrC4</b>	
<b>Amounts used</b>	
<b>Maximum daily site tonnage (kg/day): A4</b>	4,60E+02
<b>Frequency and duration of use</b>	

Scenario title	Use as a fuel - Professional
Continuous release-FD2	
Emission Days (days/year): - FD4	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:-EF1	10
Local marine water dilution factor:-EF2	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):OOC11	1,00E-04
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	1,00E-05
Release fraction to soil from process (initial release prior to RMM): - OOC6	1,00E-05
Technical conditions and measures at process (source)to prevent release	
Common practices vary across sites thus conservative process release estimates used-TCS1	
Technical onsite conditions and measures to reduce or limit discharges, air emissions	
Risk from environmental exposure is driven by humans via indirect exposure No wastewater treatment required-TCR6	
Treat air emission to provide the required removal efficiency of (%):-TR17	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): TCR8	>= 0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): TCR10	>= 0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils-OMS2	
Sludge should be incinerated, contained or reclaimed-OMS3	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%): STP3	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): STP4	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d STP6	2,30E+03
Assumed domestic sewage treatment plant flow (m3/d): STP5	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls - ETW1. Combustion emissions considered in regional exposure assessment- ETW2	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated - ERW3	
Section 3	Exposure estimation
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated-G21	
3.2. Environment	

<b>Scenario title</b>	<b>Use as a fuel - Professional</b>
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The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model-EE2	
<b>Section 4</b>	<b>Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented-G22 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23 Available hazard data do not enable the derivation of a DNEL for carcinogenic effects-G33 Available hazard data do not support the need for a DNEL to be established for other health effects-G36 Risk Management Measures are based on qualitative risk characterisation-G37	
<b>4.2. Environment</b>	
<b>RCR (water) - max</b>	1,71E-01
<b>RCR (air) - max</b>	2,67E-02
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-DSU1 Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination-DSU2 Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination-DSU3 Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> )-DSU4	

**EXPOSURE SCENARIOS APPLICABLE TO THE  
SUBSTANCECAS#68334-30-5**

Section 1	Exposure Scenario Title
Title	Manufacture of substance - Industrial
Use Descriptor	
Sector of use	3, 8, 9
Process categories	1, 2, 3, 4, 8a, 8b, 15
Environmental Release Categories	1
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling / recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid with potential for aerosol generation CS138
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at STP - OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) - G13.
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) - G2.
Other Operational Conditions affecting worker exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature) - OC7.
	Assumes a good basic standard of occupational hygiene is implemented - G1.
Contributing Scenarios	Specific Risk Management Measure and Operating Conditions
General measures applicable to all activities - CS135.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and 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 exposure potential 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; provide regular health surveillance as appropriate; identify and implement corrective actions - G25.
General measures (skin irritants) - G19.	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop - E3.
General exposures (Closed systems) - CS15.	Handle substance within a closed system - E47.
General exposures (Open systems) - CS16.	Wear suitable gloves tested to EN374 - PPE15.
Process sampling - CS2.	No other specific measures identified - EI20.
Bulk closed loading and unloading - CS501.	Handle substance within a closed system - E47. Wear suitable gloves tested to EN374 - PPE15.
Bulk open loading and unloading - CS503.	Wear suitable gloves tested to EN374 - PPE15.
Equipment cleaning and maintenance - CS39.	Drain down system prior to equipment break-in or maintenance - E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
Laboratory activities - CS36.	No other specific measures identified - EI20.
Bulk product storage - CS85.	Handle substance within a closed system - E84.
Section 2.2	Control of environmental exposure
Product characteristics	
Substance is complex UVCB - PrC3.	
Predominantly hydrophobic - PrC4a.	
Amounts used	
Fraction of EU tonnage used in region: - A1	0,1
Regional use tonnage (tones/year): - A2	2,80E+07
Fraction of Regional tonnage used locally: - A3	0,021
Annual site tonnage (tonnes/year): - A5	6,00E+05
Maximum daily site tonnage (kg/day): - A4	2,00E+06
Frequency and duration of use	
Continuous release - FD2.	

Title		Manufacture of substance - Industrial
Emission days (days/year): - FD4	300	
Environmental factors not influenced by risk management		
Local freshwater dilution factor: - EF1	10	
Local marine water dilution factor: - EF2	100	
Other given operational conditions affecting environmental exposure		
Release fraction to air from process (initial release prior to RMM): - OOC4	1,00E-02	
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	3,00E-05	
Release fraction to soil from process (initial release prior to RMM): - OOC6	0,0001	
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used - TCS1.		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Risk from environmental exposure is driven by freshwater sediment - TCR1b.		
Prevent discharge of undissolved substance to or recover from onsite wastewater - TCR14.		
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required - TCR9.		
Treat air emission to provide a typical removal efficiency of (%): - TCR7	90	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): TCR8	>=90,3	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%): - TCR10	>=0	
Organisation measures to prevent/limit release from site		
Prevent discharge of undissolved substance to or recover from wastewater - OMS1.		
Do not apply industrial sludge to natural soils - OMS2.		
Sludge should be incinerated, contained or reclaimed - OMS3.		
Conditions and measures related to municipal sewage treatment plant		
Estimativa da remoção da substância das águas residuais através do tratamento de esgotos domésticos (%): - STP3	94,1	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): - STP4	94,1	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): - STP6	3,30E+06	
Assumed domestic sewage treatment plant flow (m3/d): - STP5	10000	
Conditions and measures related to external treatment of waste for disposal		
During manufacturing no waste of the substance is generated to treat - ERW2.		
Conditions and measures related to external recovery of waste		
During manufacturing no waste of the substance is generated to recover - ERW2.		
Section 3		Exposure Estimation
3.1. Health		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated - G21.		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model - EE2.		
Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		



Title		Manufacture of substance - Industrial
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures / Operational Conditions outlined in Section 2 are implemented - G22. Where other Risk Management Measures / Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects - G32. Available hazard data do not support the need for a DNEL to be established for other health effects - G36. Risk Management Measures are based on qualitative risk characterisation - G37.</p>		
<b>4.2. Environment</b>		
<b>RCR (water)</b>		6,06E-01
<b>RCR (air)</b>		1,01E-01
<p>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 - DSU1. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination - DSU2. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination - DSU3. Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>) - DSU4. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file – “Site-Specific Production” worksheet - DSU6. If scaling reveals a condition of unsafe use (i.e., RCRs &gt; 1), additional RMMs or a site-specific chemical safety assessment is required - DSU8.</p>		

Section 1	
Title	Exposure Scenario Title
	<b>Distribution of Substance - Industrial</b>
<b>Use Descriptor</b>	
Sector of use	3
Process categories	1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
<b>Processes, tasks, activities covered</b>	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities.
<b>Assessment method</b>	See section 3.
Section 2	
Operational conditions and risk management measures	
Section 2.1	
Control of worker exposure	
Product characteristics	
Physical form of product	Liquid with potential for aerosol generation CS138.
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at STP. OC3
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting worker exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently G15; Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	
Specific Risk Management Measure and Operating Conditions	
<b>General measures applicable to all activities CS135</b>	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and 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 exposure potential 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; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
<b>General measures (skin irritants) G19</b>	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
<b>General exposures (Closed systems) CS15</b>	Handle substance within a closed system E47
<b>General exposures (Open systems) CS16</b>	Wear suitable gloves tested to EN374 PPE15
<b>Process sampling CS2</b>	No other specific measures identified EI20
<b>Laboratory activities CS36</b>	No other specific measures identified EI20
<b>Bulk closed loading and unloading CS501</b>	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
<b>Bulk open loading and unloading CS503</b>	Wear suitable gloves tested to EN374 PPE15
<b>Drum and small pack filling CS6</b>	Wear suitable gloves tested to EN374 PPE15
<b>Equipment cleaning and maintenance CS39</b>	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
<b>Storage CS67</b>	Handle substance within a closed system. E84
Section 2.2	
Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3].	
Predominantly hydrophobic [PrC4a].	

Title	Distribution of Substance - Industrial
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Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tones/year)	2.8e7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	5.6e4
Maximum daily site tonnage (kg/day)	1.9e5
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100

Title	Distribution of Substance - Industrial
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#### Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM) 1.0e-3

Release fraction to wastewater from process (initial release prior to RMM) 1.0e-6

Release fraction to soil from process (initial release prior to RMM) 0.00001

#### Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used [TCS1].

#### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk from environmental exposure is driven by human via indirect exposure (primarily ingestion) [TCR1j]

Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].

No wastewater treatment required [TCR6].

Treat air emission to provide a typical removal efficiency of (%) 90

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency (%)  $\geq 0$

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)  $\geq 0$

#### Organisation measures to prevent/limit release from site

Prevent discharge of undissolved substance to or recover from wastewater [OMS1].

Do not apply industrial sludge to natural soils [OMS2].

Sludge should be incinerated, contained or reclaimed [OMS3].

#### Conditions and measures related to municipal sewage treatment plant

Estimated substance removal from wastewater via domestic sewage treatment (%) 94.1

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%) 94.1

Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d) 2.9e6

Assumed domestic sewage treatment plant flow (m3/d) 2000

#### Conditions and measures related to external treatment of waste for disposal

External treatment and disposal of waste should comply with applicable regulations [ETW3].

#### Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable regulations [ERW1].

### Section 3 Exposure Estimation

#### 3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21

#### 3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

### Section 4 Guidance to check compliance with the Exposure Scenario

Title	Distribution of Substance - Industrial
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#### 4.1. Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures / Operational Conditions outlined in Section 2 are implemented G22. Where other Risk Management Measures / Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.

#### 4.2. Environment

RCR (água) 5,99E-02

RCR (ar) 5,29E-03

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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>) [DSU4].

Section 1	
Exposure Scenario Title	
Title	Formulation & (Re)packing of substance - Industrial
Use Descriptor	
Sector of use	3, 10
Process categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletization, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities.
Assessment method	See section 3
Section 2	
Operational conditions and risk management measures	
Section 2.1	
Control of worker exposure	
Product characteristics	
Physical form of product	Liquid with potential for aerosol generation CS138.
Vapour pressure	vapour pressure < 0.5 kPa at STP. OC3
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting worker exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently G15; Assumes a good basic standard of occupational hygiene is implemented G1
Contributing Scenarios	Specific Risk Management Measure and Operating Conditions
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and 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 exposure potential 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; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
General exposures (Closed systems) CS15	Handle substance within a closed system E47
General exposures (Open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process sampling CS2	No other specific measures identified EI20
Drum and small package filling CS8	Use drum pumps or carefully pour from container E64 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Bulk transfers CS14	Wear suitable gloves tested to EN374 PPE15
Mixing operations (open systems) CS30	Provide extract ventilation to points where emissions occur E54 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
Production or preparation or articles by tableting, compression, extrusion or pelletisation CS100	Wear suitable gloves tested to EN374 PPE15

Title		Formulation & (Re)packing of substance - Industrial
Drum and small package filling CS8		Wear suitable gloves tested to EN374 PPE15
Laboratory activities CS36		No other specific measures identified EI20
Equipment clean down and maintenance CS39		Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67		Store substance within a closed system. E84
Section 2.2		Control of environmental exposure
<b>Product characteristics</b>		
Substance is complex UVCB [PrC3].		
Predominantly hydrophobic [PrC4a].		
<b>Amounts used</b>		
Fraction of EU tonnage used in region	0.1	
Regional use tonnage (tones/year)	2.8e7	
Fraction of Regional tonnage used locally	0.0011	
Annual site tonnage (tonnes/year)	3.0e4	
Maximum daily site tonnage (kg/day)	1.0e5	
<b>Frequency and duration of use</b>		
Continuous release [FD2].		
Emission days (days/year)	300	
<b>Environmental factors not influenced by risk management</b>		
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
<b>Other given operational conditions affecting environmental exposure</b>		
Release fraction to air from process (initial release prior to RMM)	1.0e-2	
Release fraction to wastewater from process (initial release prior to RMM)	2.0e-5	
Release fraction to soil from process (initial release prior to RMM)	0.0001	
<b>Technical conditions and measures at process level (source) to prevent release</b>		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>		
Risk from environmental exposure is driven by freshwater sediment [TCR1b].		
Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].		
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].		
Treat air emission to provide a typical removal efficiency of (%)	0	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency (%)	≥59.9	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	≥0	
<b>Organisation measures to prevent/limit release from site</b>		
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].		
Do not apply industrial sludge to natural soils [OMS2].		
Sludge should be incinerated, contained or reclaimed [OMS3].		

Title		Formulation & (Re)packing of substance - Industrial
<b>Conditions and measures related to municipal sewage treatment plant</b>		
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6.8e5	
Assumed domestic sewage treatment plant flow (m3/d)	2000	
<b>Conditions and measures related to external treatment of waste for disposal</b>		
External treatment and disposal of waste should comply with applicable regulations [ETW3].		
<b>Conditions and measures related to external recovery of waste</b>		
External recovery and recycling of waste should comply with applicable regulations [ERW1].		
<b>Section 3</b>		<b>Exposure Estimation</b>
<b>3.1. Health</b>		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21		
<b>3.2. Environment</b>		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].		
<b>Section 4</b>		<b>Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures / Operational Conditions outlined in Section 2 are implemented G22. Where other Risk Management Measures / Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.		
<b>4.2. Environment</b>		
RCR (água) - max	1,47E-01	
RCR (ar) - max	5,03E-01	
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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) [DSU4].		



Section 1	Exposure Scenario
Scenario title	Use as a fuel - Industrial
<b>Use descriptors</b>	
Sector(s) of Use	3
Process Category(ies)	1, 2, 3, 8a, 8b, 16
Environmental Release Category(ies)	7
Specific Environmental Release Category(ies)	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
<b>Product Characteristics</b>	
Physical form of product	Liquid with potential for aerosol generation CS138.
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at STP - OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) - G13.
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) - G2.
Other operational conditions of use affecting environmental exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently - G15. Assumes a good basic standard of occupational hygiene is implemented - G1.
Contributing Scenarios	Specific operational conditions and risk management measures
General measures applicable to all activities - CS135.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and 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 exposure potential 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; provide regular health surveillance as appropriate; identify and implement corrective actions - G25.
General measures (skin irritants) - G19.	Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop - E3.
Bulk transfers - CS14.	Wear suitable gloves tested to EN374 - PPE15.
Drum/batch transfers - CS8.	Wear suitable gloves tested to EN374 - PPE15.
Use as a fuel - GEST12. (closed systems) - CS107.	No other specific measures identified - E120.
Equipment cleaning and maintenance - CS39.	Drain down system prior to equipment break-in or maintenance - E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
Storage - CS67.	Store substance within a closed system - E84.
Section 2.2	Control of environmental exposure
<b>Product characteristics</b>	
Substance is complex UVCB - PrC3.	
Predominantly hydrophobic - PrC4.	
<b>Amounts used</b>	
Fraction of EU tonnage used in region: - A1	0,1
Regional use tonnage (tonnes/year): - A2	4,50E+06
Fraction of Regional tonnage used locally: - A3	0,34
Annual site tonnage (tonnes/year): - A5	1,50E+06
Maximum daily site tonnage (kg/day):-A4	5,00E+06
<b>Frequency and duration of use</b>	
Continuous release - FD2.	
Emission Days (days/year): - FD4	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor: - EF1	10
Local marine water dilution factor: - EF2	100
<b>Other given operational conditions affecting environmental exposure</b>	
Release fraction to air from process (initial release prior to RMM): - OOC4	5,00E-03
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	0,00001
Release fraction to soil from process (initial release prior to RMM): - OOC6	0
<b>Technical conditions and measures at process (source)to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used - TCS1.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions</b>	
Risk from environmental exposure is driven by freshwater sediment - TCR1b.	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required - TCR9.	
Treat air emission to provide the required removal efficiency of (%): - TCR7	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of % (%): - TCR8	97.7

Scenario title		Use as a fuel - Industrial
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): - TCR10	60.4	
<b>Organisation measures to prevent/limit release from site</b>		
Prevent discharge of undissolved substance to or recover from wastewater - OMS1.		
Do not apply industrial sludge to natural soils - OMS2.		
Sludge should be incinerated, contained or reclaimed - OMS3.		
<b>Conditions and measures related to municipal sewage treatment plant</b>		
Estimated substance removal from wastewater via domestic sewage treatment (%): - STP3	94.1	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): - STP4	97.7	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): - STP6	5,00E+06	
Assumed domestic sewage treatment plant flow (m3/d): - STP5	2000	
<b>Conditions and measures related to external treatment of waste for disposal</b>		
Combustion emissions limited by required exhaust emission controls - ETW1.		
Combustion emissions considered in regional exposure assessment - ETW2.		
<b>Conditions and measures related to external recovery of waste</b>		
External recovery and recycling of waste should comply with applicable local and/or national regulations - ERW1.		
<b>Section 3</b>		<b>Exposure estimation</b>
<b>3.1. Health</b>		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated - G21.		
<b>3.2. Environment</b>		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model - EE2.		
<b>Section 4</b>		<b>Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented - G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects - G32. Available hazard data do not support the need for a DNEL to be established for other health effects - G36. Risk Management Measures are based on qualitative risk characterisation - G37.		
<b>4.2. Environment</b>		
RCR (water)	9,09E-01	
RCR (air)	6,32E-02	
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 - DSU1. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination - DSU2. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination - DSU3. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) - DSU4.		

Section 1	
Exposure Scenario	
Scenario title	Use as a fuel - Professional
Use descriptors	
Sector(s) of Use	22
Process Category(ies)	1, 2, 3, 8a, 8b, 16
Environmental Release Category(ies)	9a, 9b
Specific Environmental Release Category(ies)	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	
Operational conditions and risk management measures	
Section 2.1	Control of worker exposure
Product Characteristics	
Physical form of product	Liquid with potential for aerosol generation CS138.
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at STP - OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) - G13.
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) - G2.
Other operational conditions of use affecting environmental exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently - G15. Assumes a good basic standard of occupational hygiene is implemented - G1.
Contributing Scenarios	Specific operational conditions and risk management measures
General measures applicable to all activities - CS135.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and 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 exposure potential 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; provide regular health surveillance as appropriate; identify and implement corrective actions - G25.
General measures (skin irritants) - G19.	Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop - E3.
Bulk transfers - CS14.	Wear suitable gloves tested to EN374 - PPE15.
Drum/batch transfers - CS8.	Use drum pumps or carefully pour from container - E64. Wear suitable gloves tested to EN374 - PPE15.
Refuelling - CS507.	Wear suitable gloves tested to EN374 - PPE15.
Use as a fuel - GEST_12I. (closed systems) - CS107.	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) - E11. or Ensure operation is undertaken outdoors - E69.
Equipment cleaning and maintenance - CS39.	Drain down system prior to equipment break-in or maintenance - E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training - PPE16.
Storage - CS67.	Store substance within a closed system - E84.
Section 2.2	Control of environmental exposure
Product characteristics	
Substance is complex UVCB - PrC3.	
Predominantly hydrophobic - PrC4.	
Amounts used	
Fraction of EU tonnage used in region: - A1	0,1
Regional use tonnage (tonnes/year): - A2	6,70E+06
Fraction of Regional tonnage used locally: - A3	0,0005
Annual site tonnage (tonnes/year): - A5	3,30E+03
Maximum daily site tonnage (kg/day):-A4	9,20E+03
Frequency and duration of use	
Continuous release - FD2.	
Emission Days (days/year): - FD4	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor: - EF1	10
Local marine water dilution factor: - EF2	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM): - OOC4	1,00E-04
Release fraction to wastewater from process (initial release prior to RMM): - OOC5	0,00001
Release fraction to soil from process (initial release prior to RMM): - OOC6	0,00001
Technical conditions and measures at process (source)to prevent release	

Scenario title		Use as a fuel - Professional
Common practices vary across sites thus conservative process release estimates used - TCS1.		
Technical onsite conditions and measures to reduce or limit discharges, air emissions		
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) - TCR1j.		
No wastewater treatment required - TCR6.		
Treat air emission to provide the required removal efficiency of (%): - TCR7	N/A	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <sup>3</sup> (%): - TCR8	≥0	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): - TCR10	≥0	
Organisation measures to prevent/limit release from site		
Prevent discharge of undissolved substance to or recover from wastewater - OMS1.		
Do not apply industrial sludge to natural soils - OMS2.		
Sludge should be incinerated, contained or reclaimed - OMS3.		
Conditions and measures related to municipal sewage treatment plant		
Estimated substance removal from wastewater via domestic sewage treatment (%): - STP3	94.1	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): - STP4	94.1	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d): - STP6	1,40E+05	
Assumed domestic sewage treatment plant flow (m3/d): - STP5	2000	
Conditions and measures related to external treatment of waste for disposal		
Combustion emissions limited by required exhaust emission controls - ETW1		
Combustion emissions considered in regional exposure assessment - ETW2.		
Conditions and measures related to external recovery of waste		
External recovery and recycling of waste should comply with applicable local and/or national regulations - ERW1.		
Section 3		Exposure estimation
3.1. Health		
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated - G21.		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model - EE2.		
Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented - G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels - G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects - G32. Available hazard data do not support the need for a DNEL to be established for other health effects - G36. Risk Management Measures are based on qualitative risk characterisation - G37.		
4.2. Environment		
RCR (water)	5,99E-02	
RCR (air)	5,45E-03	
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 - DSU1. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination - DSU2. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination - DSU3. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) - DSU4.		