



# SAFETY DATA SHEET

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

### 1.1. Product identifier

**Name of the substance** Diesel Fuels and Gas Oils - All Grades (Refer to Synonyms for Product Name)  
**Identification number** 649-224-00-6 (Index number)  
**Registration number** 01-2119484664-27-0052  
**Synonyms** Ultra Low Sulphur Diesel, FAME Free \* Ultra Low Sulphur Diesel, up to 7% FAME \* Ultra Low Sulphur Gas Oil , Unmarked - FAME Free \* Ultra Low Sulphur Gasoil, Unmarked, up to 7% FAME \* High Sulphur Diesel \* GTL Diesel \* Unfinished Diesel  
**SDS number** 2004

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

**Identified uses** Use as a fuel.  
A complete list of registered uses for this product can be found in the table of content of the exposure scenario for communication, available as an annex to the eSDS.  
**Uses advised against** All other uses.

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

#### Supplier

**Company name** Valero Energy Ltd  
1st Floor, Block B  
**Address** D22 X0Y3, Quarryvale  
Ireland  
**Telephone** 01/210 345 4593 (General information; US)  
**e-mail** CorpHSE@valero.com  
**Contact person** Industrial Hygienist

**1.4. Emergency telephone number** 0044/(0)18 65 407333

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

#### Classification according to Regulation (EC) No 1272/2008 as amended

##### Physical hazards

Flammable liquids Category 3 H226 - Flammable liquid and vapour.

##### Health hazards

Acute toxicity, inhalation Category 4 H332 - Harmful if inhaled.  
Skin corrosion/irritation Category 2 H315 - Causes skin irritation.  
Carcinogenicity Category 2 H351 - Suspected of causing cancer.  
Specific target organ toxicity - repeated exposure Category 2 (thymus, liver, bone marrow) H373 - May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.  
Aspiration hazard Category 1 H304 - May be fatal if swallowed and enters airways.

##### Environmental hazards

Hazardous to the aquatic environment, long-term aquatic hazard Category 2 H411 - Toxic to aquatic life with long lasting effects.

### 2.2. Label elements

#### Label according to Regulation (EC) No. 1272/2008 as amended

**Contains:** Fuels, diesel

## Hazard pictograms



## Signal word

Danger

## Hazard statements

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

## Precautionary statements

### Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist/vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

### Response

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P331	Do NOT induce vomiting.

### Storage

Not assigned.

### Disposal

Not assigned.

## Supplemental information on the label

None.

## 2.3. Other hazards

Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Hydrogen sulphide (H<sub>2</sub>S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations. This mixture does not contain substances assessed to be vPvB / PBT according to Regulation (EC) No 1907/2006, Annex XIII. The mixture does not contain any substances included in the list established in accordance with REACH Article 59(1) for having endocrine disrupting properties at a concentration equal to or greater than 0.1% by weight. The mixture does not contain any substances having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0.1% by weight.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

#### General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Fuels, diesel	100	68334-30-5 269-822-7	01-2119484664-27-0052	649-224-00-6	
<b>Classification:</b> Flam. Liq. 3;H226, Acute Tox. 4;H332;(ATE: 11 mg/l), Skin Irrit. 2;H315, Carc. 2;H351, STOT RE 2;H373, Asp. Tox. 1;H304, Aquatic Chronic 2;H411					

#### Composition comments

This product is registered under the REACH Regulation 1907/2006 as a UVCB. All concentrations are in percent by weight unless ingredient is a gas. Hydrogen sulphide (H<sub>2</sub>S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations. The full text for all H-statements is displayed in section 16.

Note N: The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Part 3.

## SECTION 4: First aid measures

#### General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

#### 4.1. Description of first aid measures

##### Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a poison centre or doctor/physician if you feel unwell.

##### Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Call a physician or poison control centre immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>4.2. Most important symptoms and effects, both acute and delayed</b>	Aspiration may cause pulmonary oedema and pneumonitis. Direct contact with eyes may cause temporary irritation. Skin irritation. May cause redness and pain. Jaundice. Prolonged exposure may cause chronic effects.
<b>4.3. Indication of any immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

## SECTION 5: Firefighting measures

<b>General fire hazards</b>	Flammable liquid and vapour.
<b>5.1. Extinguishing media</b>	
<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>5.2. Special hazards arising from the substance or mixture</b>	Thermal decomposition may produce smoke, oxides of carbon and lower molecular weight organic compounds whose composition have not been characterised. Sulphur oxides. Nitrogen Oxides (NO <sub>x</sub> ). Vapours may form explosive mixtures with air. Vapours may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
<b>5.3. Advice for firefighters</b>	
<b>Special protective equipment for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Special fire fighting procedures</b>	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.

## SECTION 6: Accidental release measures

<b>6.1. Personal precautions, protective equipment and emergency procedures</b>	
<b>For non-emergency personnel</b>	Wear appropriate personal protective equipment.
<b>For emergency responders</b>	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use personal protection recommended in Section 8 of the SDS.
<b>6.2. Environmental precautions</b>	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
<b>6.3. Methods and material for containment and cleaning up</b>	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil etc) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. The product is immiscible with water and will spread on the water surface. Prevent entry into waterways, sewer, basements or confined areas.  Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.  Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Clean surface thoroughly to remove residual contamination.  Never return spills to original containers for re-use. Put material in suitable, covered, labelled containers.
<b>6.4. Reference to other sections</b>	For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Before entering storage tanks and commencing any operation in a confined area check the atmosphere for oxygen content and flammability. (Subject to applicability) If sulphur compounds are suspected to be present in the product, check the atmosphere for H<sub>2</sub>S content. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist/vapours. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

### 7.2. Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see section 10 of the SDS).

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

ANNEX 1, PART 1 Categories of dangerous substances

Hazard categories in accordance with Regulation (EC) No 1272/2008

- P5a, b or c FLAMMABLE LIQUIDS (Lower-tier requirements = 50 tonnes; Upper-tier requirements = 200 tonnes)

- E2 Hazardous to the Aquatic Environment Chronic (Lower-tier requirements = 200 tonnes; Upper-tier requirements = 500 tonnes)

### 7.3. Specific end use(s)

Observe industrial sector guidance on best practices. For detailed information, see section 1.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### Occupational exposure limits

##### Ireland. Occupational Exposure Limits

Material	Type	Value
Fuels, diesel (CAS 68334-30-5)	TWA	100 mg/m <sup>3</sup>

#### Biological limit values

No biological exposure limits noted for the ingredient(s).

#### Recommended monitoring procedures

Follow standard monitoring procedures.

#### Derived no effect levels (DNELs)

##### General population

Product	Value	Assessment factor	Notes
Diesel Fuels and Gas Oils - All Grades (Refer to Synonyms for Product Name) (CAS 68334-30-5)			
Long-term, Systemic, Dermal	1.3 mg/kg bw/day		
Long-term, Systemic, Inhalation	20 mg/m <sup>3</sup>		
Long-term, Systemic, Oral	1.3 mg/kg bw/day		
Short-term, Systemic, Inhalation	2600 mg/m <sup>3</sup>		

##### Workers

Product	Value	Assessment factor	Notes
Diesel Fuels and Gas Oils - All Grades (Refer to Synonyms for Product Name) (CAS 68334-30-5)			
Long-term, Systemic, Dermal	2.9 mg/kg bw/day		
Long-term, Systemic, Inhalation	68.3 mg/m <sup>3</sup>		
Short-term, Systemic, Inhalation	4300 mg/m <sup>3</sup>		

#### Predicted no effect concentrations (PNECs)

Not available.

#### Exposure guidelines

##### Ireland Exposure Limit Values: Skin designation

Fuels, diesel (CAS 68334-30-5)

Can be absorbed through the skin.

### 8.2. Exposure controls

#### Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

## Individual protection measures, such as personal protective equipment

<b>General information</b>	Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles). Eye protection should meet standard EN 166.
<b>Skin protection</b>	
- <b>Hand protection</b>	Wear suitable gloves tested to EN374. In full contact: Glove material: Nitrile rubber. Layer thickness: 0.225 mm. Breakthrough time: >480 min. Splash contact: Glove material: Neoprene; Layer thickness: 0.75 mm; Breakthrough time: 10-30 min.
- <b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	In case of inadequate ventilation or risk of inhalation of oil mist, suitable respiratory equipment with combination filter (type A2/P2) can be used.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>Hygiene measures</b>	Observe any medical surveillance requirements. When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.
<b>Environmental exposure controls</b>	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. Fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

<b>Physical state</b>	Liquid.
<b>Form</b>	Liquid.
<b>Colour</b>	Colourless to green/brown.
<b>Odour</b>	Petroleum.
<b>Melting point/freezing point</b>	Not applicable.
<b>Boiling point or initial boiling point and boiling range</b>	> 160 - < 400 °C (> 320 - < 752 °F)
<b>Flammability</b>	Flammable liquid and vapour.
<b>Upper/lower flammability or explosive limits</b>	
<b>Explosive limit - lower (%)</b>	Not determined.
<b>Explosive limit – upper (%)</b>	Not determined.
<b>Flash point</b>	> 56 °C (> 132.8 °F)
<b>Auto-ignition temperature</b>	>= 225 °C (>= 437 °F)
<b>Decomposition temperature</b>	Not determined.
<b>pH</b>	Not applicable.
<b>Kinematic viscosity</b>	Not determined.
<b>Solubility</b>	
<b>Solubility (water)</b>	Insoluble in water.
<b>Partition coefficient (n-octanol/water) (log value)</b>	Not determined.
<b>Vapour pressure</b>	0.4 kPa (40°C)
<b>Density and/or relative density</b>	
<b>Density</b>	> 0.8 - < 0.91 g/cm <sup>3</sup>
<b>Relative density</b>	> 0.8 - < 0.91
<b>Vapour density</b>	Not applicable.
<b>Particle characteristics</b>	Not applicable.

### 9.2. Other information

**9.2.1. Information with regard to physical hazard classes** No relevant additional information available.

### 9.2.2. Other safety characteristics

**Viscosity** >= 1.5 mm<sup>2</sup>/s (50°C)

## SECTION 10: Stability and reactivity

**10.1. Reactivity** The product is stable and non-reactive under normal conditions of use, storage and transport.

<b>10.2. Chemical stability</b>	Material is stable under normal conditions.
<b>10.3. Possibility of hazardous reactions</b>	No dangerous reaction known under conditions of normal use.
<b>10.4. Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
<b>10.5. Incompatible materials</b>	Strong oxidising agents.
<b>10.6. Hazardous decomposition products</b>	No hazardous decomposition products are known.

## SECTION 11: Toxicological information

**General information** Occupational exposure to the substance or mixture may cause adverse effects.

### Information on likely routes of exposure

<b>Inhalation</b>	Harmful if inhaled.
<b>Skin contact</b>	Causes skin irritation.
<b>Eye contact</b>	Direct contact with eyes may cause temporary irritation.
<b>Ingestion</b>	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.

**Symptoms** Aspiration may cause pulmonary oedema and pneumonitis. Skin irritation. May cause redness and pain. Jaundice.

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

**Acute toxicity** May be fatal if swallowed and enters airways. Harmful if inhaled. Hydrogen sulphide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere.

Product	Species	Test Results
Fuels, diesel (CAS 68334-30-5)		
<b>Acute</b>		
<b>Dermal</b>		
LD50	Rabbit	> 4300 mg/kg
<b>Inhalation</b>		
<i>vapour/aerosol</i>		
LC50	Rat	4.1 mg/l, 4 Hours
<b>Oral</b>		
LD50	Rat	> 5000 mg/kg
<b>Skin corrosion/irritation</b>	Causes skin irritation.	
<b>Serious eye damage/eye irritation</b>	Direct contact with eyes may cause temporary irritation.	
<b>Respiratory sensitisation</b>	Based on available data, the classification criteria are not met.	
<b>Skin sensitisation</b>	Based on available data, the classification criteria are not met.	
<b>Germ cell mutagenicity</b>	Based on available data, the classification criteria are not met.	
<b>Carcinogenicity</b>	Suspected of causing cancer.	
<b>Reproductive toxicity</b>	Based on available data, the classification criteria are not met.	
<b>Specific target organ toxicity - single exposure</b>	Based on available data, the classification criteria are not met.	
<b>Specific target organ toxicity - repeated exposure</b>	May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.	
<b>Aspiration hazard</b>	May be fatal if swallowed and enters airways.	
<b>Mixture versus substance information</b>	No information available.	

### 11.2. Information on other hazards

<b>Endocrine disrupting properties</b>	This mixture does not contain any substances having endocrine disrupting properties with respect to human health as assessed in accordance with the criteria set out in Regulations (EC) No 1907/2006, (EU) No 2017/2100 and (EU) 2018/605, at a concentration equal to or greater than 0.1% by weight.
<b>Other information</b>	May be absorbed through the skin.

## SECTION 12: Ecological information

**12.1. Toxicity** Toxic to aquatic life with long lasting effects.

Product	Species		Test Results
Fuels, diesel (CAS 68334-30-5)			
<b>Aquatic</b>			
<i>Acute</i>			
Algae	Erl50	Algae	22 mg/l
Crustacea	EL50	Daphnia	68 mg/l
Fish	LL50	Fish	21 mg/l

**12.2. Persistence and degradability** Expected to be inherently biodegradable.

**12.3. Bioaccumulative potential** The product is not bioaccumulating.

**Partition coefficient n-octanol/water (log Kow)** Not available.

**Bioconcentration factor (BCF)** Not available.

**12.4. Mobility in soil** No data available.

**12.5. Results of PBT and vPvB assessment** This substance does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

**12.6. Endocrine disrupting properties** This mixture does not contain any substances having endocrine disrupting properties with respect to the environment as assessed in accordance with the criteria set out in Regulations (EC) No 1907/2006, (EU) No 2017/2100 and (EU) 2018/605, at a concentration equal to or greater than 0.1% by weight.

**12.7. Other adverse effects** Oil spills are generally hazardous to the environment. The product contains volatile organic compounds which have a photochemical ozone creation potential.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

**Residual waste** Dispose in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

**EU waste code** 13 07 01\*  
The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Disposal methods/information** Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

**Special precautions** Dispose in accordance with all applicable regulations.

## SECTION 14: Transport information

### ADR

**14.1. UN number** UN1202

**14.2. UN proper shipping name** DIESEL FUEL

### 14.3. Transport hazard class(es)

**Class** 3

**Subsidiary risk** -

**Label(s)** 3

**Hazard No. (ADR)** 30

**Tunnel restriction code** D/E

**14.4. Packing group** III

**14.5. Environmental hazards** Yes

**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

### RID

**14.1. UN number** UN1202

**14.2. UN proper shipping name** DIESEL FUEL

**14.3. Transport hazard class(es)**

Class 3  
Subsidiary risk -  
Label(s) 3

**14.4. Packing group** III**14.5. Environmental hazards** Yes**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**ADN****14.1. UN number** UN1202**14.2. UN proper shipping name** DIESEL FUEL**14.3. Transport hazard class(es)**

Class 3  
Subsidiary risk -  
Label(s) 3

**14.4. Packing group** III**14.5. Environmental hazards** Yes**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**IATA****14.1. UN number** UN1202**14.2. UN proper shipping name** DIESEL FUEL**14.3. Transport hazard class(es)**

Class 3  
Subsidiary risk -

**14.4. Packing group** III**14.5. Environmental hazards** Yes**ERG Code** 3L**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**IMDG****14.1. UN number** UN1202**14.2. UN proper shipping name** DIESEL FUEL**14.3. Transport hazard class(es)**

Class 3  
Subsidiary risk -

**14.4. Packing group** III**14.5. Environmental hazards****Marine pollutant** Yes**EmS** F-E, S-E**14.6. Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**14.7. Maritime transport in bulk according to IMO instruments** Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.**General information** Shipping descriptions in this section are offered as examples only. Classification for transport must accurately reflect the material hazards as designated under a variety of regulations and is solely the responsibility of the person offering the material for transport into commerce.**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU regulations****Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended**

Not listed.

**Regulation (EU) 2019/1021 On persistent organic pollutants (recast), as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended**

Not listed.



**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended**  
Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended**  
Not listed.

**Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended**  
Not listed.

**Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA**  
Not listed.

#### Authorisations

**Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**  
Not listed.

#### Restrictions on use

**Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**  
Not listed.

**Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.**  
Not listed.

#### Other EU regulations

**Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended**  
Fuels, diesel (CAS 68334-30-5)

#### Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended.  
Directive 2012/18/EU on major accident hazards involving dangerous substances: Part 2 (Named dangerous substances) - 34. Petroleum products and alternative fuels.

#### National regulations

According to Directive 92/85/EEC as amended, pregnant women should not work with the product, if there is the least risk of exposure.

Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work, as amended. Follow national regulation for work with chemical agents in accordance with Directive 98/24/EC, as amended.

#### 15.2. Chemical safety assessment

Chemical Safety Assessment has been carried out.

### SECTION 16: Other information

#### List of abbreviations

DNEL: Derived No-Effect Level.  
PNEC: Predicted No-Effect Concentration.  
PBT: Persistent, bioaccumulative and toxic.  
vPvB: Very Persistent and very Bioaccumulative.

#### References

Chemical safety report.  
CONCAWE  
ECHA: European Chemical Agency.

#### Information on evaluation method leading to the classification of mixture

Not applicable.

#### Full text of any statements, which are not written out in full under sections 2 to 15

H226 Flammable liquid and vapour.  
H304 May be fatal if swallowed and enters airways.  
H315 Causes skin irritation.  
H332 Harmful if inhaled.  
H351 Suspected of causing cancer.  
H373 May cause damage to organs through prolonged or repeated exposure.  
H411 Toxic to aquatic life with long lasting effects.

#### Training information

Follow training instructions when handling this material.

#### Disclaimer

The information in this Safety Data Sheet (SDS) was obtained from sources believed to be reliable and accurate, and is not represented as being absolutely complete. The end user of this product has the responsibility for evaluating the adequacy of the data for the intended application and conditions of use; for determining the safety, toxicity, regulatory requirements, and suitability of the product under these conditions; and for obtaining additional or clarifying data where uncertainty exists. The data serves as general guidance only, and is to be used in combination with professional judgement of persons experienced in a specific application, use or process; and additional data may be required.

## Annex to the extended Safety Data Sheet (eSDS)

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3. ES: Use as an intermediate (SU8, SU9, ERC6a, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15)	17
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5. ES: Use in Oil and Gas field drilling and production operations (SU3, ERC4, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b)	23
6. ES: Use as a fuel, Industrial (SU3, ERC7, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)	26
7. ES: Functional Fluids, Industrial. (SU3, ERC7, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9)	29
8. ES: Use as a fuel, Professional (SU22, ERC9b, ERC9a, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)	32
9. ES: Use as a fuel (SU21, ERC9b, ERC9a, PC13)	35

# 1 - Exposure Scenario Worker

## 1. Manufacture of substance

### List of use descriptors

Sector(s) of Use                      Manufacture of substance

Name of contributing environmental scenario and corresponding ERC                      ERC1: Manufacture of the substance

List of names of contributing worker scenarios and corresponding PROCs                      PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC4: Chemical production where opportunity for exposure arises  
PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities  
PROC15: Use as laboratory reagent

### 2.1.1. Contributing scenario controlling environmental exposure for Manufacture of the substance

#### Product characteristics

Physical state                      Liquid.  
Substance is complex UVCB. Predominantly hydrophobic

#### Amounts used

Fraction of EU tonnage used in region:                      0.1  
Regional use tonnage                      26000000 tonnes/year  
Fraction of regional tonnage used locally                      0.75  
Annual site tonnage                      19000000 tonnes/year  
Maximum daily site tonnage                      64000000 kg/day

#### Frequency and duration of use

Continuous process                      300 days/year

#### Environment factors not influenced by risk management

Local freshwater dilution factor:                      10  
Local marine water dilution factor:                      100

#### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	300	0.0059	0.0001	0.00000041	

#### Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release                      Common practices vary across sites thus conservative process release estimates used.

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

Air                      Treat air emission to provide a typical removal efficiency of (%): 90  
Soil                      Not applicable.  
Water                      Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 94.4. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0.  
Sediment                      Not applicable.

Organisational measures to prevent/limit release from site                      Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

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

#### Size of municipal sewage system/treatment plant (m3/d)

Type                      Onsite Sewage Treatment Plant

<b>Discharge rate</b>	10000 m <sup>3</sup> /day
<b>Treatment effectiveness</b>	94.5 %
<b>Sludge treatment technique</b>	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
<b>Remarks</b>	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 6.5e7 kg/d
<b>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</b>	94.5 %

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable waste treatment</b>	During manufacturing no waste of the substance is generated.
<b>Disposal methods</b>	Not applicable.
<b>Treatment effectiveness</b>	Not available.

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable recover operations</b>	During manufacturing no waste of the substance is generated.
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## 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

#### Product characteristics

<b>Physical form of the product</b>	Liquid With potential for aerosol generation
<b>vapour pressure</b>	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

#### Amounts used

Covers percentage substance in the product up to 100 %.

#### Frequency and duration of use

Covers daily exposures up to 8 hours

#### Human factors not influenced by risk management

#### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

#### Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

#### Risk management measures (RMM)

<b>Technical conditions and measures at process level (source) to prevent release</b>	General exposures (closed systems): Handle substance within a closed system. Bulk closed loading and unloading: Handle substance within a closed system. Bulk product storage: Store substance within a closed system.
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Process sampling: No other specific measures identified. Laboratory activities: No other specific measures identified.
<b>Organizational measures to prevent/limit releases, dispersion and exposure</b>	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.  Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

General exposures (open systems): Wear suitable gloves tested to EN374.

Bulk closed loading and unloading: Wear suitable gloves tested to EN374.

Bulk open loading and unloading: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### **3. Exposure Estimation**

#### **Environment**

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

#### **Health**

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

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

#### **Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### **Health**

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

## 2 - Exposure Scenario Worker

### 1. Formulation & (re)packing of substances and mixtures

#### List of use descriptors

**Sector(s) of Use** SU10: Formulation [mixing] of preparations and/or re-packaging

**Name of contributing environmental scenario and corresponding ERC** ERC2: Formulation into mixture

**List of names of contributing worker scenarios and corresponding PROCs**

PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC4: Chemical production where opportunity for exposure arises  
PROC5: Mixing or blending in batch processes  
PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities  
PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)  
PROC14: Tableting, compression, extrusion, pelettisation, granulation  
PROC15: Use as laboratory reagent

#### 2.1.1. Contributing scenario controlling environmental exposure for Formulation into mixture

##### Product characteristics

**Physical state** Liquid.  
Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 0.1  
**Regional use tonnage** 30000000 tonnes/year  
**Fraction of regional tonnage used locally** 0.001  
**Annual site tonnage** 30000 tonnes/year  
**Maximum daily site tonnage** 100000 kg/day

##### Frequency and duration of use

**Continuous process** 300 days/year

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** 10  
**Local marine water dilution factor:** 100

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	300	0.01	0.0001	0.00005	

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Common practices vary across sites thus conservative process release estimates used.

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

**Air** Treat air emission to provide a typical removal efficiency of (%): 0  
**Soil** Not applicable.  
**Water** Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 94.1. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0.  
**Sediment** Not applicable.

**Organisational measures to prevent/limit release from site** Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

## Conditions and measures related to municipal sewage treatment plant

### Size of municipal sewage system/treatment plant (m<sup>3</sup>/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	20000 m <sup>3</sup> /day
Treatment effectiveness	94.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 1.1e5 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.5 %

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

### Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

## Conditions and measures related to external recovery of waste

### Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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## 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

### Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

### Amounts used

Covers percentage substance in the product up to 100 %.

### Frequency and duration of use

Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

### Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Batch processes at elevated temperatures: Provide extract ventilation to points where emissions occur. Drum/batch transfers: Use drum pumps or carefully pour from container. Bulk transfers: Handle substance within a closed system. Mixing operations (open systems): Provide extract ventilation to points where emissions occur. Laboratory activities: No other specific measures identified. Process sampling: No other specific measures identified.

**Organizational measures to prevent/limit releases, dispersion and exposure**

General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.

Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

General measures (skin irritants): 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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

General exposures (open systems): Wear suitable gloves tested to EN374.

Drum/batch transfers: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Bulk transfers: Wear suitable gloves tested to EN374.

Production of preparations or articles by tableting, compression, extrusion, pelettisation: Wear suitable gloves tested to EN374.

Drum and small package filling: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Mixing operations (open systems): Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### 3. Exposure Estimation

#### Environment

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

#### Health

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### Health

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



### 3 - Exposure Scenario Worker

#### 1. Use as an intermediate

##### List of use descriptors

**Sector(s) of Use** SU8: Manufacture of bulk, large scale chemicals (including petroleum products)  
SU9: Manufacture of fine chemicals

**Name of contributing environmental scenario and corresponding ERC** ERC6a: Use of intermediate

**List of names of contributing worker scenarios and corresponding PROCs** PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC4: Chemical production where opportunity for exposure arises  
PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities  
PROC15: Use as laboratory reagent

#### 2.1.1. Contributing scenario controlling environmental exposure for Use of intermediate

##### Product characteristics

**Physical state** Liquid.  
Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 0.1  
**Regional use tonnage** 1000000 tonnes/year  
**Fraction of regional tonnage used locally** 0.015  
**Annual site tonnage** 15000 tonnes/year  
**Maximum daily site tonnage** 50000 kg/day

##### Frequency and duration of use

**Continuous process** 300 days/year

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** 10  
**Local marine water dilution factor:** 100  
**Other factors** Estimated substance removal from wastewater via domestic sewage treatment (%): 94.9

##### Other given operational conditions affecting environmental exposure

Type	Emission days		Emission factors			Remarks
	(days/year)	Air	Soil	Water		
initial release prior to RMM	300	0.001	0.001	0.000099		

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Common practices vary across sites thus conservative process release estimates used.

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

**Air** Treat air emission to provide a typical removal efficiency of (%): 80  
**Soil** Not applicable.  
**Water** Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 94.1. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0.  
**Sediment** Not applicable.

**Organisational measures to prevent/limit release from site** Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

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

#### Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m <sup>3</sup> /day
Treatment effectiveness	94.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.4e4 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.5 %

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

##### Fraction of used amount transferred to external waste treatment

Suitable waste treatment	This substance is consumed during use and no waste of the substance is generated.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

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

##### Fraction of used amount transferred to external waste treatment

Suitable recover operations	This substance is consumed during use and no waste of the substance is generated.
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### 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

#### Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

#### Amounts used

Covers percentage substance in the product up to 100 %.

#### Frequency and duration of use

Covers daily exposures up to 8 hours

#### Human factors not influenced by risk management

#### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

#### Other relevant operational conditions

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

#### Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	General exposures (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities: No other specific measures identified. Bulk closed loading and unloading: Handle substance within a closed system. Process sampling: No other specific measures identified.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.  Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

General exposures (open systems): Wear suitable gloves tested to EN374.

Bulk closed loading and unloading: Wear suitable gloves tested to EN374.

Bulk open loading and unloading: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### 3. Exposure Estimation

#### Environment

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

#### Health

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### Health

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

## 4 - Exposure Scenario Worker

### 1. Distribution of substance

#### List of use descriptors

<b>Sector(s) of Use</b>	Distribution of substance
<b>Name of contributing environmental scenario and corresponding ERC</b>	ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC5: Use at industrial site leading to inclusion into/onto article ERC6a: Use of intermediate ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC6c: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) ERC6d: Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) ERC7: Use of functional fluid at industrial site
<b>List of names of contributing worker scenarios and corresponding PROCs</b>	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent

#### 2.1.1. Contributing scenario controlling environmental exposure for Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

##### Product characteristics

**Physical state** Liquid.  
Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 0.1  
**Regional use tonnage** 31000000 tonnes/year  
**Fraction of regional tonnage used locally** 0.002  
**Annual site tonnage** 61000 tonnes/year  
**Maximum daily site tonnage** 200000 kg/day

##### Frequency and duration of use

**Continuous process** 300 days/year

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** 10  
**Local marine water dilution factor:** 100

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	300	0.001	0.00001	0.00001	

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Common practices vary across sites thus conservative process release estimates used.

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

**Air** Treat air emission to provide a typical removal efficiency of (%): 90  
**Soil** Not applicable.  
**Water** Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 87.0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0

<b>Sediment</b>	Not applicable.
<b>Organisational measures to prevent/limit release from site</b>	Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
<b>Conditions and measures related to municipal sewage treatment plant</b>	
<b>Size of municipal sewage system/treatment plant (m3/d)</b>	
<b>Type</b>	Onsite Sewage Treatment Plant
<b>Discharge rate</b>	2000 m <sup>3</sup> /day
<b>Treatment effectiveness</b>	94.5 %
<b>Sludge treatment technique</b>	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
<b>Remarks</b>	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 3.9e5 kg/d
<b>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</b>	94.5 %

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

**Fraction of used amount transferred to external waste treatment**

<b>Suitable waste treatment</b>	External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Disposal methods</b>	Not applicable.
<b>Treatment effectiveness</b>	Not available.

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

**Fraction of used amount transferred to external waste treatment**

<b>Suitable recover operations</b>	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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**2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions**

**Product characteristics**

<b>Physical form of the product</b>	Liquid With potential for aerosol generation
<b>vapour pressure</b>	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

**Amounts used**

Covers percentage substance in the product up to 100 %.

**Frequency and duration of use**

Covers daily exposures up to 8 hours

**Human factors not influenced by risk management**

**Other given operational conditions affecting workers exposure**

Assumes a good basic standard of occupational hygiene is implemented.

**Other relevant operational conditions**

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Risk management measures (RMM)**

<b>Technical conditions and measures at process level (source) to prevent release</b>	General exposures (closed systems): Handle substance within a closed system. Storage: Handle substance within a closed system.
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Laboratory activities: No other specific measures identified. Bulk closed loading and unloading: Handle substance within a closed system. Process sampling: No other specific measures identified.

**Organizational measures to prevent/limit releases, dispersion and exposure**

Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.

Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

General exposures (open systems): Wear suitable gloves tested to EN374.

Bulk closed loading and unloading: Wear suitable gloves tested to EN374.

Bulk open loading and unloading: Wear suitable gloves tested to EN374.

Drum and small package filling: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### 3. Exposure Estimation

#### Environment

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

#### Health

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

### 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

#### Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### Health

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

## 5 - Exposure Scenario Worker

### 1. Use in Oil and Gas field drilling and production operations

#### List of use descriptors

**Sector(s) of Use** SU3: Industrial uses

**Name of contributing environmental scenario and corresponding ERC** ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

**List of names of contributing worker scenarios and corresponding PROCs**

PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
 PROC4: Chemical production where opportunity for exposure arises  
 PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
 PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities

#### 2.1.1. Contributing scenario controlling environmental exposure for Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

##### Product characteristics

**Physical state** Liquid.  
Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 1  
**Regional use tonnage** 20000 tonnes/year

##### Frequency and duration of use

**Continuous process** Continuous

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** Not available.

**Local marine water dilution factor:** Not available.

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
Not applicable.					

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Discharge to aquatic environment is restricted (see section 4.2).

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

**Air** Not available.  
**Soil** Not available.  
**Water** Not available.  
**Sediment** Not available.

**Organisational measures to prevent/limit release from site** Prevent environmental discharge consistent with regulatory requirements.

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

##### Size of municipal sewage system/treatment plant (m3/d)

**Type** Municipal Sewage Treatment Plant  
**Discharge rate** Not available.  
**Sludge treatment technique** Not available.

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

**Fraction of used amount transferred to external waste treatment**

<b>Suitable waste treatment</b>	External treatment and disposal of waste should comply with applicable local and/or national regulations. Cuttings and process water are disposed according to local and/or national regulations.
<b>Disposal methods</b>	Not applicable.
<b>Treatment effectiveness</b>	Not available.

**Conditions and measures related to external recovery of waste****Fraction of used amount transferred to external waste treatment**

<b>Suitable recover operations</b>	External recovery and recycling of waste should comply with applicable local and/or national regulations.
<b>Remarks</b>	Cuttings and process water are disposed according to local and/or national regulations.

**2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions****Product characteristics**

<b>Physical form of the product</b>	Liquid.
<b>vapour pressure</b>	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

**Amounts used**

Covers percentage substance in the product up to 100 %.

**Frequency and duration of use**

Covers daily exposures up to 8 hours

**Human factors not influenced by risk management****Other given operational conditions affecting workers exposure**

Assumes use at not more than 20°C above ambient temperature.

**Other relevant operational conditions**

Assumes a good basic standard of occupational hygiene is implemented

**Risk management measures (RMM)**

<b>Technical conditions and measures at process level (source) to prevent release</b>	General exposures (closed systems): Handle substance within a closed system. Storage: Store substance within a closed system.
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Bulk transfers: Transfer via enclosed lines. Drilling mud (re-)formulation: No other specific measures identified. Operation of solids filtering equipment: Provide the operation with a properly sited receiving hood. Cuttings treatment and disposal: Provide extract ventilation to points where emissions occur. Sample collection: No other specific measures identified.
<b>Organizational measures to prevent/limit releases, dispersion and exposure</b>	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.



**Conditions and measures related to personal protection, hygiene and health evaluations**

General measures (skin irritants): 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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Filling / preparation of equipment from drums or containers: Wear suitable gloves tested to EN374.

Drill floor operations: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Cleaning of solids filtering equipment: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

General exposures (open systems): Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Pouring from small containers: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### **3. Exposure Estimation**

#### **Environment**

Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.

#### **Health**

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

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

#### **Environment**

Offshore drilling: Discharge to aquatic environment is restricted by law and industry prohibits release. OSPAR Commission 2009. Discharges, Spills, and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007.

#### **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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.

## 6 - Exposure Scenario Worker

### 1. Use as a fuel, Industrial

#### List of use descriptors

**Sector(s) of Use** SU3: Industrial uses

**Name of contributing environmental scenario and corresponding ERC** ERC7: Use of functional fluid at industrial site

**List of names of contributing worker scenarios and corresponding PROCs**

PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
 PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
 PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities  
 PROC16: Use of fuels

#### 2.1.1. Contributing scenario controlling environmental exposure for Use of functional fluid at industrial site

##### Product characteristics

**Physical state** Liquid.  
 Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 0.1  
**Regional use tonnage** 3700000 tonnes/year  
**Fraction of regional tonnage used locally** 0.4  
**Annual site tonnage** 1500000 tonnes/year  
**Maximum daily site tonnage** 5000000 kg/day

##### Frequency and duration of use

**Continuous process** Emission days (days/year): 100

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** 10  
**Local marine water dilution factor:** 100

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	300	0.005	0	0.000001	

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Common practices vary across sites thus conservative process release estimates used.

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

**Air** Treat air emission to provide a typical removal efficiency of (%): 95  
**Soil** Not applicable.  
**Water** Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 94.3. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0.  
**Sediment** Not applicable.

**Organisational measures to prevent/limit release from site** Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

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

##### Size of municipal sewage system/treatment plant (m3/d)

**Type** Onsite Sewage Treatment Plant  
**Discharge rate** 2000 m<sup>3</sup>/day

<b>Treatment effectiveness</b>	94.5 %
<b>Sludge treatment technique</b>	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
<b>Remarks</b>	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 5.2e6 kg/d
<b>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</b>	94.5 %

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable waste treatment</b>	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Treatment effectiveness</b>	Not available.

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable recover operations</b>	This substance is consumed during use and no waste of the substance is generated.
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## 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

#### Product characteristics

<b>Physical form of the product</b>	Liquid With potential for aerosol generation
<b>vapour pressure</b>	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

#### Amounts used

Covers percentage substance in the product up to 100 %.

#### Frequency and duration of use

Covers daily exposures up to 8 hours

#### Human factors not influenced by risk management

#### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

#### Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Risk management measures (RMM)

<b>Technical conditions and measures at process level (source) to prevent release</b>	Use as a fuel (closed systems): No other specific measures identified. Storage: Handle substance within a closed system.
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Not available.
<b>Organizational measures to prevent/limit releases, dispersion and exposure</b>	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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.  Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Bulk transfers: Wear suitable gloves tested to EN374.

Drum/batch transfers: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### **3. Exposure Estimation**

#### **Environment**

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

#### **Health**

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

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

#### **Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### **Health**

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

## 7 - Exposure Scenario Worker

### 1. Functional Fluids, Industrial.

#### List of use descriptors

**Sector(s) of Use** SU3: Industrial uses

**Name of contributing environmental scenario and corresponding ERC** ERC7: Use of functional fluid at industrial site

**List of names of contributing worker scenarios and corresponding PROCs**

PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions  
 PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
 PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
 PROC4: Chemical production where opportunity for exposure arises  
 PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities  
 PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities  
 PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

#### 2.1.1. Contributing scenario controlling environmental exposure for Use of functional fluid at industrial site

##### Product characteristics

**Physical state** Liquid.  
 Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

**Fraction of EU tonnage used in region** 0.1  
**Regional use tonnage** 1400 tonnes/year  
**Fraction of regional tonnage used locally** 0.0069  
**Annual site tonnage** 10 tonnes/year  
**Maximum daily site tonnage** 500 kg/day

##### Frequency and duration of use

**Continuous process** Emission days (days/year): 20

##### Environment factors not influenced by risk management

**Local freshwater dilution factor:** 10  
**Local marine water dilution factor:** 100

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	20	0.005	0.001	0.00003	

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Common practices vary across sites thus conservative process release estimates used.

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

**Air** Treat air emission to provide a typical removal efficiency of (%): 0  
**Soil** Not applicable.  
**Water** Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of  $\geq$  (%): 36.0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of  $\geq$  (%): 0  
**Sediment** Not applicable.

**Organisational measures to prevent/limit release from site** Risk from environmental exposure is driven by freshwater. Prevent discharge of undissolved substance to or recover from onsite wastewater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.

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

### Size of municipal sewage system/treatment plant (m3/d)

Type	Onsite Sewage Treatment Plant
Discharge rate	2000 m <sup>3</sup> /day
Treatment effectiveness	94.5 %
Sludge treatment technique	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Remarks	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 9.7e2 kg/d
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.5 %

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

#### Fraction of used amount transferred to external waste treatment

Suitable waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Not applicable.
Treatment effectiveness	Not available.

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

#### Fraction of used amount transferred to external waste treatment

Suitable recover operations	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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## 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

### Product characteristics

Physical form of the product	Liquid With potential for aerosol generation
vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

### Amounts used

Covers percentage substance in the product up to 100 %.

### Frequency and duration of use

Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

### Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release	Filling of articles/equipment (closed systems): Transfer via enclosed lines. Equipment operation (closed systems): No other specific measures identified. Storage: Store substance within a closed system.
Technical conditions and measures to control dispersion from source towards the worker	Bulk transfers: No other specific measures identified. Equipment operations (open systems): Restrict area of openings and provide extract ventilation to emission points when substance handed at elevated temperatures.
Organizational measures to prevent/limit releases, dispersion and exposure	General measures applicable to all activities: Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions.

**Conditions and measures related to personal protection, hygiene and health evaluations**

General measures (skin irritants): 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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Drum/batch transfers: Wear suitable gloves tested to EN374.

Re-work and re-manufacture of articles: Wear suitable gloves tested to EN374.

Filling / preparation of equipment from drums or containers: Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### **3. Exposure Estimation**

#### **Environment**

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

#### **Health**

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

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

#### **Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### **Health**

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Risk Management Measures are based on qualitative risk characterisation.

## 8 - Exposure Scenario Worker

### 1. Use as a fuel, Professional

**List of use descriptors**

<b>Sector(s) of Use</b>	SU22: Professional uses
<b>Name of contributing environmental scenario and corresponding ERC</b>	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
<b>List of names of contributing worker scenarios and corresponding PROCs</b>	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC8b: Transfer of substance or mixture (charging/discharging) at dedicated facilities PROC16: Use of fuels

#### 2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

**Product characteristics**

<b>Physical state</b>	Liquid. Substance is complex UVCB. Predominantly hydrophobic
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**Amounts used**

<b>Fraction of EU tonnage used in region</b>	0.1
<b>Regional use tonnage</b>	6800000 tonnes/year
<b>Fraction of regional tonnage used locally</b>	0.0005
<b>Annual site tonnage</b>	3400 tonnes/year
<b>Maximum daily site tonnage</b>	9300 kg/day

**Frequency and duration of use**

<b>Continuous process</b>	Emission days (days/year): 365
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**Environment factors not influenced by risk management**

<b>Local freshwater dilution factor:</b>	10
<b>Local marine water dilution factor:</b>	100

**Other given operational conditions affecting environmental exposure**

Type	Emission days (days/year)	Emission factors			Remarks
		Air	Soil	Water	
initial release prior to RMM	365	0.0001	0.00001	0.00001	

**Risk management measures (RMM)**

<b>Technical conditions and measures at process level (source) to prevent release</b>	Common practices vary across sites thus conservative process release estimates used.
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
<b>Air</b>	Not applicable.
<b>Soil</b>	Not applicable.
<b>Water</b>	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%): 86.9. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%): 0
<b>Sediment</b>	Not applicable.
<b>Organisational measures to prevent/limit release from site</b>	Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion). If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.

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

**Size of municipal sewage system/treatment plant (m3/d)**

<b>Type</b>	Onsite Sewage Treatment Plant
<b>Discharge rate</b>	2000 m <sup>3</sup> /day



<b>Treatment effectiveness</b>	94.5 %
<b>Sludge treatment technique</b>	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
<b>Remarks</b>	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 2.2e4 kg/d
<b>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)</b>	94.5 %

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable waste treatment</b>	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Disposal methods</b>	Not applicable.
<b>Treatment effectiveness</b>	Not available.
<b>Remarks</b>	Not applicable.

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable recover operations</b>	This substance is consumed during use and no waste of the substance is generated.
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### 2.2.1. Contributing scenario controlling worker exposure for Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

#### Product characteristics

<b>Physical form of the product</b>	Liquid With potential for aerosol generation
<b>vapour pressure</b>	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

#### Amounts used

Covers percentage substance in the product up to 100 %.

#### Frequency and duration of use

Covers daily exposures up to 8 hours

#### Human factors not influenced by risk management

#### Other given operational conditions affecting workers exposure

Assumes a good basic standard of occupational hygiene is implemented.

#### Other relevant operational conditions

Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Risk management measures (RMM)

<b>Technical conditions and measures at process level (source) to prevent release</b>	Use as a fuel (closed systems): Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). or Ensure operation is undertaken outdoors. Storage: Store substance within a closed system.
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Drum/batch transfers: Use drum pumps or carefully pour from container.
<b>Organizational measures to prevent/limit releases, dispersion and exposure</b>	General measures applicable to all activities: Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of 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. Equipment cleaning and maintenance: Drain down system prior to equipment break-in or maintenance.

**Conditions and measures related to personal protection, hygiene and health evaluations**

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 any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Bulk transfers: Wear suitable gloves tested to EN374. Drum/batch transfers: Wear suitable gloves tested to EN374. Refuelling: Wear suitable gloves tested to EN374. Equipment cleaning and maintenance: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### **3. Exposure Estimation**

#### **Environment**

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

#### **Health**

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

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

#### **Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

#### **Health**

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

## 9 - Exposure Scenario Consumer

### 1. Use as a fuel

#### List of use descriptors

<b>Sector(s) of Use</b>	SU21: Consumer uses
<b>Name of contributing environmental scenario and corresponding ERC</b>	ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
<b>List of names of contributing consumer scenarios and corresponding PROCs</b>	PC13: Fuels

#### 2.1.1. Contributing scenario controlling environmental exposure for Widespread use of functional fluid (indoor)

##### Product characteristics

**Physical state** Substance is complex UVCB. Predominantly hydrophobic

##### Amounts used

<b>Fraction of EU tonnage used in region</b>	0.1
<b>Regional use tonnage</b>	19000000 tonnes/year
<b>Fraction of regional tonnage used locally</b>	0.0005
<b>Annual site tonnage</b>	9500 tonnes/year
<b>Maximum daily site tonnage</b>	26000 kg/day

##### Frequency and duration of use

**Continuous process** Emission days (days/year): 365

##### Environment factors not influenced by risk management

<b>Local freshwater dilution factor:</b>	10
<b>Local marine water dilution factor:</b>	100

##### Other given operational conditions affecting environmental exposure

Type	Emission days (days/year)		Emission factors			Remarks
			Air	Soil	Water	
initial release prior to RMM	300		0.0001	0.00001	0.00001	

##### Risk management measures (RMM)

**Technical conditions and measures at process level (source) to prevent release** Not available.

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

##### Size of municipal sewage system/treatment plant (m3/d)

<b>Type</b>	No wastewater treatment required.
<b>Discharge rate</b>	2000 m <sup>3</sup> /day
<b>Treatment effectiveness</b>	94.5 %
<b>Sludge treatment technique</b>	Not available.
<b>Remarks</b>	Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal 6.2e4 kg/d

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

##### Fraction of used amount transferred to external waste treatment

<b>Suitable waste treatment</b>	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Disposal methods</b>	Not applicable.
<b>Treatment effectiveness</b>	Not available.
<b>Remarks</b>	Not applicable.

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

## Fraction of used amount transferred to external waste treatment

**Suitable recover operations** This substance is consumed during use and no waste of the substance is generated.

## 2.2.1. Contributing exposure scenario controlling consumer exposure for Fuels

### Product characteristics

**Physical form of the product** Liquid.  
**vapour pressure** Liquid, vapour pressure > 10 Pa at Standard Temperature and Pressure  
**Process temperature** Assumes activities are at ambient temperature (unless stated differently).

### Amounts used

**Liquid: automotive refuelling** < 37500 g Covers percentage substance in the product up to 100 %.  
**Liquid: home space heater fuel** < 1500 g Covers percentage substance in the product up to 100 %.  
**Liquid: garden equipment - use** < 750 g Covers percentage substance in the product up to 100 %.  
**Liquid: garden equipment - refuelling** < 750 g Covers percentage substance in the product up to 100 %.

### Frequency and duration of use

	Duration	Frequency of use	Remarks
Liquid: automotive refuelling	< 0.05	52 days per year	(Duration unit = hour)
Liquid: scooter refuelling	< 0.03	120 days per year	(Duration unit = hour)
Liquid: garden equipment - use	< 2	26 days per year	(Duration unit = hour)
Liquid: garden equipment - refuelling	< 0.03	26 days per year	(Duration unit = hour)

### Human factors not influenced by risk management

**Exposed skin areas** Liquid: automotive refuelling Covers skin contact area up to 210 cm<sup>2</sup>  
Liquid: home space heater fuel Covers skin contact area up to 210 cm<sup>2</sup>  
Liquid: garden equipment - refuelling Covers skin contact area up to 420 cm<sup>2</sup>

### Other given operational conditions affecting consumer exposure

Area of use	Room size	Temperature	Ventilation rate	Remarks
Liquid: automotive refuelling	100 m <sup>3</sup>			Outdoor use
Liquid: home space heater fuel	20 m <sup>3</sup>			Indoor use
Liquid: garden equipment - use	100 m <sup>3</sup>			Outdoor use
Liquid: garden equipment - refuelling	34 m <sup>3</sup>			Indoor use

### Other relevant operational conditions

Not available.

### Risk management measures (RMM)

#### Conditions and measures related to information and behavioral advice to consumers

Not available.

**Conditions and measures related to personal protection, hygiene and health evaluations** No specific risk management measure identified beyond those operational conditions stated.

## 3. Exposure Estimation

### Environment

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

### Health

The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC report #107 and the chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these source, then they are indicated.

#### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES**

##### Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

##### 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. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.