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

1.1 Product identifier

Product Name	Diesel Fuel
Product Description	V3017-ULSD-Fuels, diesel
Trade Name	ULSD
Product code	ULSD, V3017
CAS No.	68334-30-5
EC No.	269-822-7
REACH Registration No.	-

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

Identified Use(s)

No.	Exposure Scenario	Page:
1	Distribution of Fuels, Diesel	**11**
2	Formulation and (re)packing Fuels, Diesel	**15**
3	Use as a fuel (Industrial)	**19**
4	Use as a fuel (Professional)	**22**
5	Use as a fuel (Consumer)	**26**

Uses Advised Against: Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification:

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

Telephone	+31 10 498 7200
Fax	+31 10 452 9545
E-Mail (competent person)	xreach@vitol.com

1.4 Emergency telephone number

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

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation (EC) No. 1272/2008 (CLP)

Flam. Liq. 3; H226
Asp. Tox. 1; H304
Skin Irrit. 2; H315
Acute Tox. 4; H332
Carc. 2; H351
STOT RE 2; H373
Aquatic Chronic 2; H411

2.2 Label elements

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

Product Name: V3017-ULSD-Fuels, diesel

Hazard Pictogram(s)

Signal Word(s): Danger

Hazard Statement(s)	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: Liver, Bone marrow and Thymus. H411: Toxic to aquatic life with long lasting effects.
Precautionary Statement(s)	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P260: Do not breathe fume. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting. P273: Avoid release to the environment.

2.3 Other hazards

May form explosive mixture with air. The vapour is heavier than air; beware of pits and confined spaces. May cause irritation to eyes and air passages.
Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

SUBSTANCE	CAS No.	EC No.	REACH Registration No.	%W/W
Fuels, diesel	68334-30-5	269-822-7	-	100

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Self-protection of the first aider	Eliminate sources of ignition. If it is suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Avoid all contact. Do not ingest. If swallowed then seek immediate medical assistance.
H2S Warning:	Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations. If there is any suspicion of inhalation: A self contained breathing apparatus should be worn. Remove to fresh air immediately.
Inhalation	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical advice/attention if you feel unwell.
Skin Contact	IF ON SKIN (or hair): Remove contaminated clothing immediately and wash affected skin with plenty of water or soap and water. If irritation (redness, rash, blistering) develops, get medical attention.
Eye Contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
Ingestion	IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If vomiting occurs spontaneously, keep head below hips to prevent

aspiration into the lungs. If unconscious, place in recovery position and get medical attention immediately. Do not give anything by mouth to an unconscious person. Get medical attention immediately. Do not wait for symptoms to appear.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation: Irritation of the respiratory tract.
Skin Contact: Causes skin irritation.
Eye Contact: May cause eye irritation.
Ingestion: Aspiration into the lungs may cause chemical pneumonitis, which can be fatal. Ingestion may cause irritation of the gastrointestinal tract. Nausea, Vomiting and Diarrhoea.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Notes to a physician:

IF INHALED: If unconscious, place in recovery position and get medical attention immediately. Administer oxygen if available and artificial respiration if necessary.
IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If aspiration is suspected obtain immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing media: Extinguish with sand or dry chemical. Foam, Carbon dioxide, Water fog or dry powder

Unsuitable extinguishing media: Do not use water jet. Direct water jet may spread the fire.

5.2 Special hazards arising from the substance or mixture

Flammable liquid and vapour. Will float and can be reignited on surface water. Decomposes in a fire giving off toxic fumes: A mixture of solid and liquid particulates and gases including unidentified organic and inorganic compounds. May form explosive mixture with air. Prevent liquid entering sewers, basements and any watercourses. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. If sulphur compounds are present in appreciable amounts, combustion products may include also H2S and SOx (sulfur oxides) or sulfuric acid

5.3 Advice for fire-fighters

Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid release to the environment. Dike fire control water for later disposal.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

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

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

Small spillages: Wear flame-resistant antistatic protective clothing.

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

6.2 Environmental precautions

Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. If

		necessary: Dike area to contain the spill and prevent releases to sewers, drains, or other waterways.
6.3	**Methods and material for containment and cleaning up**	Provided it is safe to do so, isolate the source of the leak. Use non-sparking equipment when picking up flammable spill. The vapour is heavier than air; beware of pits and confined spaces. Ensure that the equipment is adequately grounded. Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing. Wear chemical protection suit and breathing apparatus.
	Spillages onto land:	In case of soil contamination, remove contaminated soil and treat in accordance with local regulations. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a lidded container for disposal or recovery. Dispose of this material and its container as hazardous waste. **Small spillages:** Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing. **Large spillages:** Cover spillage with foam to reduce evaporation. Do not use water jet.
	Spillages on water or at sea:	Collect as much as possible in clean container for reuse or disposal. **Small spillages:** Contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents. **Large spillages:** Open waters should be contained with floating barriers or other mechanical means and recovered, only if this is strictly necessary and if fire/explosion risks can be adequately prevented. Otherwise control the spreading of the spillage, and let the substance evaporate naturally.
6.4	**Reference to other sections**	See Section: 8,13

SECTION 7: HANDLING AND STORAGE

7.1	**Precautions for safe handling**	Obtain special instructions before use. Keep away from sources of ignition - No smoking. Use only outdoors or in a well-ventilated area. Prevent vapour build up by providing adequate ventilation during and after use. May form explosive mixtures with air. Take action to prevent static discharges. Use non-sparking tools. All parts of the plant and equipment should be electrically bonded together and connected to earth. Electrical continuity should be checked at regular intervals. Antistatic clothing and footwear should be used. The vapour is heavier than air; beware of pits and confined spaces. Avoid all contact with substance. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe vapour. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned.
	H2S Warning:	Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances. These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training.
7.2	**Conditions for safe storage, including any incompatibilities**	Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Bund storage facilities to prevent soil and water pollution in the event of spillage. Keep only in original packaging. Keep containers properly sealed when not in use. Protect from sunlight. Containers of this material may be hazardous when empty since they retain product residue. Empty container may contain product residue which may result in flammable or explosive vapours inside the container.
	Storage temperature	Stable at ambient temperatures.
	Storage measures	Suitable containers: Stainless steel, Mild steel Do not store in: Synthetic materials
	Incompatible materials	Keep away from oxidising agents.
7.3	**Specific end use(s)**	See Section: 1.2 and/or Exposure Scenario.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

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

8.1.2 Biological limit value

Not established.

8.1.3 PNECs and DNELs

PNEC: Not established.*

DNEL	Oral	Inhalation	Dermal
Industry - Short term - Local effects	-	4300 (mg/m³)	-
Industry - Long Term - Systemic effects	-	68 (mg/m³)	2.9 (mg/kg bw/day)
Consumer - Long Term - Systemic effects	-	20 (mg/m³)	1.3 (mg/kg bw/day)

* Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

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

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

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.
Fuels are typically used, transferred and transported in closed systems. If exposure is likely (i.e. during sampling) the following advice may be appropriate. Keep good industrial hygiene. Always wash hands before smoking, eating and drinking. Do not eat, drink or smoke at the work place.

Refer to annexes for exposure scenarios detailing use specific exposure controls

Eye/ face protection

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

Skin protection

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

Body protection: Wear anti-static clothing and shoes.
small scale: Wear suitable coveralls to prevent exposure to the skin.
large scale: Chemical protection suit.

Respiratory protection

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

Closed system(s): Not normally required.

Thermal hazards

Not applicable.

8.2.3 Environmental Exposure Controls

Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Liquid, Pale yellow
Odour	Diesel Odour
Odour threshold	Not established.
pH	Not established.
Melting point/freezing point	- 40 °C - + 6 °C
Initial boiling point and boiling range	141 – 462 °C
Flash point	> 55 °C
Evaporation rate	Not established.
Flammability (solid, gas)	Not applicable - Liquid
Upper/lower flammability or explosive limits	Not established.
Vapour pressure	0.4 kPa @ 40°C
Vapour density	Not established.
Relative density	0.8 – 0.91 g/cm³ @ 15 °C
Solubility(ies)	Immiscible with water.
Partition coefficient: n-octanol/water	Not established.
Auto-ignition temperature	> 225 °C
Decomposition Temperature	Not established.
Viscosity	≥ 1.5 mm²/s @ 40 °C
Explosive properties	Not explosive. (Vapour may create explosive atmosphere.)
Oxidising properties	Not oxidising.

9.2 Other information None known.

SECTION 10: STABILITY AND REACTIVITY

10.1 Stability and reactivity Stable under normal conditions. Reacts with - Strong oxidising agents

10.2 Chemical stability Stable under normal conditions. Hazardous polymerisation will not occur. Product may release Hydrogen Sulphide.

10.3 Possibility of hazardous reactions Extremely flammable liquid and vapour. May form explosive mixture with air. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Product may release Hydrogen Sulphide.

10.4 Conditions to avoid Elevated temperature. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from direct sunlight.

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

10.6 Hazardous decomposition product(s) A mixture of solid and liquid particulates and gases including unidentified organic and inorganic compounds. Decomposes in a fire giving off toxic fumes: COx, H2S, SOx,

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects All test data taken from existing ECHA registrations for the substances mentioned.

Acute toxicity - Ingestion Based upon the available data, the classification criteria are not met.
LD50 > 5000 mg/kg bw/day (rat) (OECD 401)

Acute toxicity - Inhalation Acute Tox. 4: Harmful if inhaled.
LC50 (inhalation,rat) mg/l/4h: 5.4 (OECD 403)

Acute toxicity - Skin Contact Based upon the available data, the classification criteria are not met.
LD50 > 4300 mg/kg bw/day (rabbit) (OECD 434)

Skin corrosion/irritation Skin Irrit. 2; Causes skin irritation.
Irritating to skin. (rabbit) (OECD 404)

Serious eye damage/irritation Based upon the available data, the classification criteria are not met.
Not irritating to eyes. (rabbit) (OECD 405)

Respiratory or skin sensitization Based upon the available data, the classification criteria are not met.
Sensitisation (guinea pig) - Negative (OECD 406)

Germ cell mutagenicity Based upon the available data, the classification criteria are not met.
In vitro: Negative (OECD 476)
In vivo: Negative (mouse) (OECD 475)

Carcinogenicity Carc. 2: May cause cancer.
ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), VGO/Hydrocracked/Distillate fuels are classified for this endpoint.

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

		ECHA Registration Endpoint summary: Reproductive toxicity: No classification is appropriate at this time. Developmental toxicity: Developmental studies only observed developmental effects at doses that caused maternal toxicity and the developmental effects cannot be separated from the maternal effects; therefore classification for developmental toxicity is not considered appropriate.
	STOT - single exposure	Based upon the available data, the classification criteria are not met. Not classified. Weight of evidence approach
	STOT - repeated exposure	STOT RE 2; May cause damage to organs through prolonged or repeated exposure.
	Oral:	No data
	Inhalation:	No adverse effect observed (rat) (OECD 453) Chronic - Systemic effects NOAEC 1402 mg/m³
	Dermal:	Causes skin irritation. (mouse) (OECD 410) Chronic - Systemic effects NOAEL 0.5 ml/kg
	Aspiration hazard	Asp. Tox. 1; May be fatal if swallowed and enters airways.
11.2	**Other information**	None.

SECTION 12: ECOLOGICAL INFORMATION

12.1	**Toxicity**	Aquatic Chronic 2; Toxic to aquatic life with long lasting effects.
	Short Term (acute):	LL50 (Fish) (96hr) 21 mg/l (OCED 203)
	Long Term (Chronic):	The aquatic toxicity was estimated using the PETROTOX computer model. Estimated: NOEL 0.083 mg/l
12.2	**Persistence and degradibility**	Readily biodegradable (according to OECD criteria).
12.3	**Bioaccumulative potential**	The product has moderate potential for bioaccumulation. Partition coefficient n-octanol/water (log P O/W): $\geq$ 3
12.4	**Mobility in soil**	The product is predicted to have low mobility in soil. Liquid with low volatility.
12.5	**Results of PBT and vPvB assessment**	Not classified as PBT or vPvB.
12.6	**Other adverse effects**	None known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1	**Waste treatment methods**	Dispose of this material and its container as hazardous waste. Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty. Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. Waste code: Fuel Oil (130701) and Diesel Fuel (150110).

SECTION 14: TRANSPORT INFORMATION

		ADR/RID	**IMDG/ADN**
14.1	**UN number**	UN 1202	UN 1202
14.2	**Proper Shipping Name**	DIESEL FUEL	DIESEL FUEL with flash-point as specified in EN 590:2013 + A1:2017
14.3	**Transport hazard class(es)**	3	3+(N2, F)
14.4	**Packing group**	III	III
14.5	**Environmental hazards**	MILIEUGEVAARLIJK / ENVIRONMENTALLY HAZARDOUS/ UMWELTGEFÄHREND /DANGEREUX POUR/ L'ENVIRONNEMENT	
14.6	**Special precautions for user**	See Section: 2	
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**	This product is being carried under the scope of MARPOL Annex 1. Special Precautions: Refer to Chapter 7 'Handling and Storage' for special precautions which a user needs to be aware of, or needs to comply with, in connection with transport.	
14.8	**Additional Information**	Special Provisions: 640L ADR HIN: 30 Tunnel Restriction Code: 3 (D/E) Limited Quantity: 5L	EmS: F-E, S-E Limited Quantity: 5L

SECTION 15: REGULATORY INFORMATION

15.1	**Safety, health and environmental regulations/legislation specific for the substance or mixture**	
15.1.1	**EU regulations**	
	Seveso	Upper Tier: 25000 tonnes Lower Tier: 2500 tonnes
15.1.2	**National regulations**	
	Germany	Wassergefährdungsklasse (Germany). WGK number: 3
15.2	**Chemical Safety Assessment**	A REACH chemical safety assessment (CSA) has been carried out. Refer to annexes for exposure scenarios detailing use specific exposure controls.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements:
Header and Section 1.3

Update version and date. New format has been issued, all sections have been updated to include new information. Review SDS with care.

References:
Existing ECHA registration(s) for Diesel Fuel (CAS No.68334-30-5) and Chemical Safety Report.

This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 453/2010.

LEGEND

LTEL	Long Term Exposure Limit
STEL	Short Term Exposure Limit
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
PBT	PBT: Persistent, Bioaccumulative and Toxic
vPvB	very Persistent and very Bioaccumulative
OECD	Organisation for Economic Cooperation and Development

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

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Annex to the extended Safety Data Sheet (eSDS)
See below -

Diesel Fuel

CAS No. 68334-30-5

EC No. 269-822-7

Summary of Parameters

Physical parameters			
Vapour pressure (kPa)			<0.5
Partition Coefficient (log K_{OW})			Individual components vary between 1.99 and 18.02
Solubility (Water) (mg/l)			Individual components vary between 2.0E+03 mg/l and 4.9E-12 mg/l
Molecular weight			Not applicable
Biodegradability			Readily biodegradable.
Human Health (DNEL)			
Workers	Short term	Inhalation (mg/m³)	4300
		Dermal (mg/kg bw/day)	No hazard identified
	Long Term	Inhalation (mg/m³)	68.3
		Dermal (mg/kg bw/day)	2.9
Consumer		Inhalation (mg/m³)	61.2
		Dermal (mg/kg bw/day)	1.3
		Oral (mg/kg bw/day)	1.3
Environmental Parameters (PNECs)			
Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.			

Contents

Contributing Scenarios

Workers

PROC1 Use in closed process, no likelihood of exposure
(Storage) Bulk storage with occasional sampling from dedicated sample point
PROC2 Use in closed, continuous process with occasional controlled exposure
(Storage) Bulk storage with occasional sampling from dedicated sample point
PROC3 Use in closed batch process (synthesis or formulation)
(Sampling) Sample collection at ventilated sample points
(Elevated) Batch processes at elevated temperatures
(fuel additive) Covers the use as a fuel (or fuel additive), and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
(Vapour) Substance in vapour phase.
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
(Manual) Manual transfer/pouring from containers
(Maintenance) Equipment maintenance
(Cleaning) Vessel and container cleaning
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
(bulk) Bulk transfer in a closed system
(Drum/batch transfers) Bulk transfers from tote tanks and supply vessels
(refuelling) Refuelling vehicles, light aircraft or marine craft.
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation
PROC15 Use as laboratory reagent
PROC16 Using material as fuel sources, limited exposure to unburned product to be expected

Environment

ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC5 Industrial use resulting in inclusion into or onto a matrix
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC6c Industrial use of monomers for manufacture of thermo-plastics
ERC7 Industrial use of substances in closed systems
ERC9a Wide dispersive indoor use of substances in closed systems
ERC9b Wide dispersive outdoor use of substances in closed systems

Consumer

PC13 Fuels
(Liquid: Automotive Refuelling)
(Home heating oil)
(Garden Equipment – Use)
(Garden Equipment – Refueling)

Exposure Scenario 1 – Distribution of Fuels, Diesel (Industrial)

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC3 (Sampling) PROC4 PROC8a (Maintenance) PROC8b (Bulk) PROC9 PROC15
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	ERC4 Industrial use of processing aids in processes and products, not becoming part of articles ERC5 Industrial use resulting in inclusion into or onto a matrix ERC6a Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b Industrial use of reactive processing aids ERC6c Industrial use of monomers for manufacture of thermo-plastics ERC7 Industrial use of substances in closed systems
Specific Environmental Release Categories SPERC	ESVOC SpERC 1.1b.v1

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid With potential for aerosol generation	
Vapour pressure	<0.5 kPa @ STP	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently).	
Exposure duration per year	300	
Other operational conditions affecting worker exposure		
Area of use	All contributing scenarios	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. ***General measures (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.		
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Equivalent to LEV - Efficiency of at least: 80%	
Technical conditions of use		
PROC1, PROC2, PROC2 (Storage), PROC3, PROC8b (Bulk)	Handle substance within a closed system.	
Risk management measures related to human health		

Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC4, PROC8b (bulk), PROC 8b (Bulk closed loading), PROC 8b (Bulk open loading), PROC9	Wear suitable gloves tested to EN374. - efficiency of at least 80%
	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. - efficiency of at least 90%
Eye Protection	No special measures are required.	

Additional good practice advice beyond the REACH CSA. Obligations according to Article 37(4) of REACH do not apply

Wear suitable gloves tested to EN374.
Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Transfer via enclosed lines
Avoid dip sampling. (PROC3 – Sampling)
Retain drain downs in sealed storage pending disposal or for subsequent recycle. Apply vessel entry procedures including use of forced supplied air.
Wear suitable coveralls to prevent exposure to the skin. (PROC 8a – Maintenance)
Fill containers/cans at dedicated fill points supplied with local extract ventilation. (PROC9)
Use fume cupboard. (PROC15)

2.2 Control of environmental exposure

Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	3.1E+07
Fraction of Regional tonnage used locally: tons/year	2.0E-03
Annual site tonnage (tons/year):	6.1E+04
Maximum daily site tonnage (kg/day):	2.0E+05
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	Not defined (default = 18,000)
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300 (Continuous release.)
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Note: 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	
Treat air emission to provide a typical removal efficiency of (%):	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	83.3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of m^3 (%):	0
Treat soil emission to provide a typical removal efficiency of (%):	Not defined
Organisational measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from onsite wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater.	
Size of municipal sewage system/treatment plant (m^3/d)	2000
Estimated substance removal from wastewater via domestic sewage treatment (%):	94.9
Conditions and measures related to external treatment of waste for disposal	
No waste generated.	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	6.7E+05

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.00	0.34	0.12	0.12
PROC2	1.0	0.01	1.37	0.47	0.49
PROC2 (Storage)	1.0	0.01	1.37	0.47	0.49
PROC3	3.0	0.04	0.34	0.12	0.16
PROC3 (Sampling)	3.0	0.04	0.34	0.12	0.16
PROC4	5.0	0.07	1.37	0.47	0.55
PROC8a (Maintenance)	2.0	0.03	1.37	0.47	0.50
PROC8b (bulk)	5.0	0.07	1.37	0.47	0.55
PROC9	5.0	0.07	1.37	0.47	0.55
PROC15	5.0	0.07	0.34	0.12	0.19

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	5.2E-02 mg/l	5.2E-03 mg/l	5.2E-04 mg/l	4.3E-02 mg/kg ww	5.8E-01 mg/kg ww	3.3E-02 mg/kg ww
Risk characterisation ratio (RCR)	3.4E-02	1.3E-01	1.3E-02	7.6E-04	2.0E-01	1.6E-02

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	1.3E+03	2.4E-02
Inhalation	5.7E+03	1.3E-03

4. Evaluation guidance to downstream user

For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater

	can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Exposure assessment instrument/tool/method	Worker	ECETOC TRA
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure Scenario 2 – Formulation and (re)packing Fuels, Diesel

1.0 Contributing Scenarios	
Sector of uses SU	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Process category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC3 (Sampling) PROC3 (Elevated) PROC4 PROC5 PROC5 (Vapour) PROC8a (Manual) PROC8a (Maintenance) PROC8b (bulk) PROC8b (Drum/batch transfers) PROC9 PROC14 PROC15
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	ERC2 Formulation of preparations
Specific Environmental Release Categories SPERC	ESVOC SpERC 2.2.v1

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid With potential for aerosol generation	
Vapour pressure	<0.5 kPa @ STP	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently).	
Exposure duration per year	300	
Other operational conditions affecting worker exposure		
Area of use	All contributing scenarios	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. ***General measures (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.		
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Equivalent to LEV - Efficiency of at least: 80%	
Technical conditions of use		

PROC1, PROC2, PROC2 (Storage), PROC3,PROC3 (Elevated), PROC8b (Bulk)	Handle substance within a closed system.	
PROC5 (Vapour)	Provide extract ventilation to points where emissions occur. (Efficiency of at least: 90%)	
PROC 8a (Manual)	Use drum pumps. (Efficiency of at least: 80%)	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC4, PROC8b (bulk), PROC 8b (Drum/batch transfers), PROC9, PROC14	Wear suitable gloves tested to EN374. - efficiency of at least 80%
	PROC5, PROC8a (Manual)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. - efficiency of at least 90%
Eye Protection	No special measures are required.	
Additional good practice advice beyond the REACH CSA. Obligations according to Article 37(4) of REACH do not apply		
Wear suitable gloves tested to EN374. Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to de-coupling. Clear spills immediately. Transfer via enclosed lines Avoid dip sampling. (PROC3 – Sampling) Retain drain downs in sealed storage pending disposal or for subsequent recycle. Apply vessel entry procedures including use of forced supplied air. Wear suitable coveralls to prevent exposure to the skin. (PROC 8a – Maintenance) Fill containers/cans at dedicated fill points supplied with local extract ventilation. (PROC9) Use fume cupboard. (PROC15)		

2.2 Control of environmental exposure	
Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	3.0E+07
Fraction of Regional tonnage used locally: tons/year	1.0E-03
Annual site tonnage (tons/year):	3.0E+04
Maximum daily site tonnage (kg/day):	1.0E+05
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	Not defined (default = 18,000)
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300 (Continuous release.)
Release fraction to air from process (initial release prior to RMM):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
Note: 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	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	96.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of m^3 (%):	35.1
Treat soil emission to provide a typical removal efficiency of (%):	Not defined
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Size of municipal sewage system/treatment plant (m^3/d)	2000
Estimated substance removal from wastewater via domestic sewage treatment (%):	94.9
Conditions and measures related to external treatment of waste for disposal	
No waste generated.	
Substance release quantities after risk management measures	

Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	1.0E+05

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.00	0.03	0.01	0.01
PROC2	1.0	0.01	1.37	0.47	0.49
PROC2 (Storage)	1.0	0.01	1.37	0.47	0.49
PROC3	3.0	0.04	0.34	0.12	0.16
PROC3 (Elevated)	0.1	0.00	0.34	0.12	0.12
PROC3 (Sampling)	3.0	0.04	0.34	0.12	0.16
PROC4	5.0	0.07	1.37	0.47	0.55
PROC5	5.0	0.07	1.37	0.47	0.55
PROC5 (Vapour)	2.5	0.36	0.07	0.02	0.38
PROC8a (Manual)	2.0	0.03	1.37	0.47	0.50
PROC8a (Maintenance)	2.0	0.03	1.37	0.47	0.50
PROC8b (bulk)	5.0	0.07	1.37	0.47	0.55
PROC8b (Drum/batch transfers)	5.0	0.07	1.37	0.47	0.55
PROC9	5.0	0.07	1.37	0.47	0.55
PROC14	5.0	0.07	0.69	0.24	0.31
PROC15	5.0	0.07	0.34	0.12	0.19

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	0.3 mg/l	0.03 mg/l	0.003 mg/l	0.05 mg/kg ww	0.7 mg/kg ww	0.07 mg/kg ww
Risk characterisation ratio (RCR)	0.2	0.75	0.075	0.0075	0.91	0.091

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	35.8	0.03
Inhalation	65.6	0.011

4. Evaluation guidance to downstream user		
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.	
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Exposure assessment instrument/tool/method	Worker	ECETOC TRA
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure Scenario 3 – Use as a fuel (Industrial)

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

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid With potential for aerosol generation	
Vapour pressure	<0.5 kPa @ STP	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently).	
Exposure duration per year	300	
Other operational conditions affecting worker exposure		
Area of use	All contributing scenarios	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. ***General measures (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.		
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Equivalent to LEV - Efficiency of at least: 80%	
PROC8a (Cleaning)	Apply vessel entry procedures including use of forced supplied air. Equivalent to LEV - Efficiency of at least: 80%	
Technical conditions of use		
PROC1, PROC2, PROC2 (Storage), PROC3 (fuel additive), PROC8b (bulk), PROC16	Handle substance within a closed system.	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC8b (bulk), PROC 8b	Wear suitable gloves tested to EN374. - efficiency of at least 80%

	(Drum/batch transfers)	
	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. - efficiency of at least 90%
Eye Protection	No special measures are required.	

Additional good practice advice beyond the REACH CSA. Obligations according to Article 37(4) of REACH do not apply

Wear suitable gloves tested to EN374.
Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Transfer via enclosed lines
Avoid dip sampling. (PROC3 – Sampling)
Retain drain downs in sealed storage pending disposal or for subsequent recycle. Apply vessel entry procedures including use of forced supplied air.
Wear suitable coveralls to prevent exposure to the skin. (PROC 8a – Maintenance)

2.2 Control of environmental exposure

Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	3.7E+06
Fraction of Regional tonnage used locally: tons/year	0.4
Annual site tonnage (tons/year):	1.5E+06
Maximum daily site tonnage (kg/day):	5.0E+06
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	Not defined (default = 18,000)
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	300 (Continuous release.)
Release fraction to air from process (initial release prior to RMM):	0.005
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	0
Note: 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	
Treat air emission to provide a typical removal efficiency of (%):	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	98.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of m^3 (%):	74.1
Treat soil emission to provide a typical removal efficiency of (%):	Not defined
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater.	
Size of municipal sewage system/treatment plant (m^3/d)	2000
Estimated substance removal from wastewater via domestic sewage treatment (%):	94.9
Conditions and measures related to external treatment of waste for disposal	
No waste generated.	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	5.0E+06

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation	Dermal	Combined

Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	1.0	0.01	1.37	0.47	0.49
PROC2	1.0	0.01	1.37	0.47	0.49
PROC2 (Storage)	1.0	0.01	0.14	0.05	0.06
PROC3 (Fuel additive)	1.0	0.01	0.34	0.12	0.13
PROC8a (Maintenance)	1.0	0.01	1.37	0.47	0.49
PROC8a (Cleaning)	1.0	0.01	1.37	0.47	0.49
PROC8b (bulk)	5.0	0.07	1.37	0.47	0.55
PROC8b (Drum/batch transfers)	5.0	0.07	1.37	0.47	0.55
PROC16	1.0	0.1	0.03	0.01	0.02

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	0.3 mg/l	0.03 mg/l	0.003 mg/l	0.05 mg/kg ww	0.7 mg/kg ww	0.07 mg/kg ww
Risk characterisation ratio (RCR)	0.2	0.75	0.075	0.009	0.91	0.091

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	35.6	0.03
Inhalation	82	0.014

4. Evaluation guidance to downstream user

For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.	
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Exposure assessment instrument/tool/method	Worker	ECETOC TRA
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure Scenario 4 – Use as a fuel (Professional)

1.0 Contributing Scenarios	
Sector of uses SU	SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category [PROC]	PROC1 PROC2 PROC1 (Storage) PROC3 (Fuel additive) PROC8a (Maintenance) PROC8a (Cleaning) PROC8b (bulk) PROC8b (Drum/batch transfers) PROC8b (refuelling) PROC16
Chemical product category [PC]	not applicable
Article Categories [AC]	not applicable
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems
Specific Environmental Release Categories SPERC	ESVOC SpERC 9.12b.v1

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid With potential for aerosol generation	
Vapour pressure	<0.5 kPa @ STP	
Concentration of substance in product	Covers concentrations up to 100%	
Human factors not influenced by risk management		
Potential exposure area	Not defined	
Frequency and duration of use		
Exposure duration per day	Covers daily exposures up to 8 hours (unless stated differently).	
Exposure duration per year	365	
Other operational conditions affecting worker exposure		
Area of use	PROC16	Outdoor
	All other PROC's	Indoor
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and clear transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of the nature of exposure and aware of basic actions to minimise exposures; Ensure suitable personal protective equipment is available; Clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; consider the need for health surveillance; identify and implement corrective actions. ***General measures (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.		
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Equivalent to LEV - Efficiency of at least: 80%	
PROC8b (Drum/batch transfers)	Transfer substance using closed system e.g. using drum pump. (Efficiency of at least: 80%)	
Technical conditions of use		
PROC1 (Storage)	Handle substance within a closed system.	
PROC16	In case of Indoor use: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Efficiency of at least: 30%	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	

Hand and/or Skin protection	PROC8b (bulk), PROC 8b (Drum/batch transfers), PROC8b (refuelling)	Wear suitable gloves tested to EN374. - efficiency of at least 80%
	PROC8a (Maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. - efficiency of at least 90%
Eye Protection	No special measures are required.	

Additional good practice advice beyond the REACH CSA. Obligations according to Article 37(4) of REACH do not apply

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Wear suitable gloves tested to EN374.
Ensure material transfers are under containment or extract ventilation.
Avoid spillage when withdrawing pump.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Transfer via enclosed lines
Retain drain downs in sealed storage pending disposal or for subsequent recycle. Apply vessel entry procedures including use of forced supplied air.
Wear suitable coveralls to prevent exposure to the skin. (PROC 8a – Maintenance)

2.2 Control of environmental exposure

Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	6.9E+06
Fraction of Regional tonnage used locally: tons/year	5.0E-04
Annual site tonnage (tons/year):	3.4E+03
Maximum daily site tonnage (kg/day):	9.4E+03
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m^3/d):	Not defined (default = 18,000)
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	365
Release fraction to air from process (initial release prior to RMM):	0.001
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E+05
Note: 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	
Treat air emission to provide a typical removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	62.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of m^3 (%):	0
Treat soil emission to provide a typical removal efficiency of (%):	Not defined
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Not applicable as there is no release to wastewater.	
Size of municipal sewage system/treatment plant (m^3/d)	2000
Estimated substance removal from wastewater via domestic sewage treatment (%):	94.9
Conditions and measures related to external treatment of waste for disposal	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	6.9E+04

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure(mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	1.0	0.01	1.37	0.47	0.49
PROC2	1.0	0.01	1.37	0.47	0.49
PROC1 (Storage)	0.01	0.00	0.34	0.12	0.12
PROC3 (Fuel additive)	1.0	0.01	0.34	0.12	0.13
PROC8a (Maintenance)	1.0	0.01	1.37	0.47	0.49
PROC8a (Cleaning)	5.0	0.07	1.37	0.47	0.55
PROC8b (bulk)	5.0	0.07	1.37	0.47	0.55
PROC8b (Drum/batch transfers)	1.0	0.01	1.37	0.47	0.49
PROC8b (refuelling)	5.0	0.07	1.37	0.47	0.55
PROC16	14.0	0.20	0.34	0.12	0.32

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.4E-03 mg/l	2.8E-03 mg/l	2.4E-05 mg/l	4.5E-02 mg/kg ww	0.5 mg/kg ww	0.02 mg/kg ww
Risk characterisation ratio (RCR)	1.6E-03	7.7E-02	6.0E-04	6.6E-03	4.7E-02	1.1E-03

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	31.2	0.02
Inhalation	5.8	0.001

4. Evaluation guidance to downstream user

For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not allow the derivation of a DNEL for eye or respiratory tract irritant effects. Risk Management Measures are based on qualitative risk characterisation.
Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Exposure Scenario 5 – Use as a fuel (Consumer)

1.0 Contributing Scenarios	
Sector of uses SU	SU21 Consumer uses: Private households (= general public = consumers)
Process category [PROC]	not applicable
Chemical product category [PC]	PC13 (Automotive – refueling) PC13 (Home heating fuel) PC13 (Liquid, Garden equipment - Use) PC13 (Liquid: Garden equipment - Refuelling)
Article Categories [AC]	not applicable
Environmental release categories [ERC]	ERC9a Wide dispersive indoor use of substances in closed systems ERC9b Wide dispersive outdoor use of substances in closed systems
Specific Environmental Release Categories SPERC	ESVOC SpERC 9.12c.v1

2.0 Operational conditions and risk management measures

2.1 Control of worker exposure

Product characteristics

Physical form of product	liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently).

Human factors not influenced by risk management

Potential exposure area

Chemical product category [PC]	Category	Skin Contact (cm²)
PC13	PC13 (Automotive); PC13 (Home heating fuel)	Palm of one hand - 210
	PC13 (Liquid: Garden equipment - Refuelling)	Both hands - 420
	PC13 (Liquid, Garden equipment - Use)	Not defined

Frequency and duration of use

Exposure duration (hours/Event)

Chemical product category [PC]	Category	Duration
PC13	PC13 (Automotive)	0.05
	PC13 (Liquid, Garden equipment - Use)	2.00
	PC13 (Liquid: Garden equipment - Refuelling); PC13 (Home heating fuel)	0.03

Frequency of use (days per year)

Chemical product category [PC]	Category	Use frequency (days per year)
PC13	PC13 (Automotive)	52
	PC13 (Home heating fuel)	120
	PC13 (Liquid, Garden equipment - Use); PC13 (Liquid: Garden equipment - Refuelling)	26

Amounts used (g/Event)

Chemical product category [PC]	Category	Mass (g)
PC13	PC13 (Automotive)	37500
	PC13 (Home heating fuel)	1500
	PC13 (Liquid, Garden equipment - Use); PC13 (Liquid: Garden equipment - Refuelling)	750

Operational conditions

Area of use	
Characteristics of the surroundings	

		Chemical product category [PC]	Category	Room size (m³)
		PC13	PC13 (Automotive); PC13 (Liquid, Garden equipment - Use)	100 or outdoors
			PC13 (Home heating fuel)	20
			PC13 (Liquid: Garden equipment - Refuelling)	34

Risk management measures	
Respiratory protection	No specific measures identified.
Hand/Skin protection	No specific measures identified.
Eye Protection	No specific measures identified.
2.2 Control of environmental exposure	
Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	1.9E+07
Fraction of Regional tonnage used locally: tons/year	5.0E-04
Annual site tonnage (tons/year):	9.5E+03
Maximum daily site tonnage (kg/day):	2.6E+04
Environment factors not influenced by risk management	
Flow rate of receiving surface water (m³/d):	Not defined (default = 18,000)
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Operational conditions	
Emission days (days/year):	365
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Organisational measures to prevent/limit release from site	
No specific measures identified.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emission to provide the required removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	0
Treat soil emission to provide a typical removal efficiency of (%):	0
Note: No specific measures identified. In the event of discharge with no STP ensure that wastes are contained, recycled and discharges are controlled within permitted consents.	
Conditions and measures related to municipal sewage treatment plant	
Size of municipal sewage system/treatment plant (m³/d)	2000
Degradation effectiveness (%)	94.9
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Substance release quantities after risk management measures	
Release to waste water from process (mg/l)	Not defined
Maximum allowable site tonnage (MSafe) (kg/d):	1.8E+05

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA
Note: Oral exposure is not expected to occur.	

	Inhalation		Dermal		Combined
Process category [PROC]	inhalation exposure*	Risk characterisation	dermal exposure*	Risk characterisation ratio (RCR)	inhalation exposure (mg/m³)

	(mg/m³)	ratio (RCR)	(mg/kg bw/day)		
PC13 (Automotive)	1.10	0.02	0.50	0.39	0.40
PC13 (Home heating fuel)	0.34	0.01	1.16	0.89	0.89
PC13 (Liquid, Garden equipment - Use)	0.51	0.01	0.00	0.00	0.01
PC13 (Liquid: Garden equipment - Refuelling)	0.06	0.00	0.49	0.38	0.38

*Yearly exposure
^Chronic

3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuels, Diesel is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for Fuels, Diesel for individual environmental compartments.

environmental exposure	STP	freshwater	marine water	soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	6.7E-03 mg/l	3.2E-03 mg/l	6.7E-05 mg/l	4.8E-02 mg/kg ww	0.5 mg/kg ww	0.02 mg/kg ww
Risk characterisation ratio (RCR)	4.3E-03	8.8E-02	1.7E-03	1.7E-02	6.0E-02	2.3E-03

Indirect exposure to humans via the environment:

Exposure route	Exposure estimation (µg/kg/day)	Risk characterisation ratio (RCR)
Oral	31.3	0.024
Inhalation	5.8	0.001

4. Evaluation guidance to downstream user

For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Exposure assessment instrument/tool/method	Workers	ECETOC TRA
	environmental exposure	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.