ΕΚΠΑΙΔΕΥΤΙΚΟ ΚΕΙΜΕΝΟ
ΑΚΑΔΗΜΙΩΝ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ

ΙΔΡΥΜΑ ΕΥΓΕΝΙΔΟΥ 1954

ΧΡΥΣΟΥΝ ΜΕΤΑΛΛΙΟΝ
ΑΚΑΔΗΜΙΑΣ ΑΘΗΝΩΝ

ΔΙΑΧΕΙΡΙΣΗ ΚΡΙΣΕΩΝ

ΙΩΑΝΝΑΣ ΣΙΜΩΝΗ

ΠΑΡΑΡΤΗΜΑ Ι

ΠΛΟΙΑΡΧΩΝ

Περιεχόμενα:

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

1.1 Product identifier

Product Name	Diesel Fuel
Product Description	V3018-Gasoil-Fuels, diesel
Trade Name	Gasoil
Product code	Gasoil
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: V3018-Gasoil-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	> 56 °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
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: 640K 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 SDS Regulation 2015/830 format, all sections have been updated to include new information. Please 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.

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

1.1 Product identifier

Product Name	Gasoline
Product Description	V4024-GASOLINE BLENDSTOCK-Gasoline
Trade Name	GASOLINE BLENDSTOCK
Product code	GASBLEND
CAS No.	86290-81-5
EC No.	289-220-8
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 Gasoline (0 – 1 % benzene content)	**12**
2	Formulation and (re)packing of gasoline (0 – 1 % benzene content)	**15**
3	Use of Gasoline (0 – 1 % benzene content) as a fuel - Industrial	**18**
4	Use of Gasoline (0 – 1 % benzene content) as a fuel - Professional	**21**
5	Use of Gasoline (0 – 1 % benzene content) as a fuel - Consumer	**24**

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. 1; H224
Asp. Tox. 1; H304
Skin Irrit. 2; H315
Muta. 1B; H340
Carc. 1B; H350
Repr. 2; H361fd
STOT SE 3; H336 (Central nervous system, Inhalation)
Aquatic Chronic 2; H411

2.2 Label elements

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

Product Description: V4024-GASOLINE BLENDSTOCK-Gasoline

Hazard Pictogram(s)

Signal Word(s) Danger

Hazard Statement(s)

H224: Extremely flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H340: May cause genetic defects.
H350: May cause cancer.
H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.
H336: May cause drowsiness or dizziness. (Central nervous system, Inhalation)
H411: Toxic to aquatic life with long lasting effects.

Precautionary Statement(s)

P201: Obtain special instructions before use.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P331: Do NOT induce vomiting.
P403+P233: Store in a well-ventilated place. Keep container tightly closed.

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.	%W/W
Gasoline	86290-81-5	289-220-8	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: May cause drowsiness or dizziness. Headache, nausea and vomiting. Skin Contact: Causes skin irritation. Eye Contact: Causes serious 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**	Extremely 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. Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Gasoline Derived No Effect Level	Oral	Inhalation	Dermal
Worker - Long Term - Systemic effects	-	1300 mg/m³	-
Worker - Long Term - Local effects	-	840 mg/m³	-
Worker - Acute - Local effects	-	1100 mg/m³	-
Consumer - Long Term - Systemic effects	-	1200 mg/m³	-
Consumer - Long Term - Local effects	-	180 mg/m³	-
Consumer - Acute - Local effects	-	640 mg/m³	-

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 A1 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	Colourless liquid
Odour	Hydrocarbon
Odour threshold	Not established.
pH	Not established.
Melting point/freezing point	< - 60 °C
Initial boiling point and boiling range	< 35 °C
Flash point	< 0 °C
Evaporation rate	Not established.
Flammability (solid, gas)	Not applicable - Liquid
Upper/lower flammability or explosive limits	Flammable Limits (Lower) (%v/v) 1 Flammable Limits (Upper) (%v/v) 10
Vapour pressure	4 - 240 kPa @ 37.8°C
Vapour density	> 2
Relative density	0.62 – 0.88 g/cm³ @ 15 °C
Solubility(ies)	Immiscible with water.
Partition coefficient: n-octanol/water	Not applicable. Substance is complex UVCB.
Auto-ignition temperature	> 220 °C
Decomposition Temperature	Not established.
Viscosity	1 mm²/s @ 20 °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 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	Based upon the available data, the classification criteria are not met. LC50 Vapour > 5600 mg/m³ Air (rat) (OECD 403)
	Acute toxicity - Skin Contact	Based upon the available data, the classification criteria are not met. LD50 > 2000 mg/kg bw/day (rabbit) (OECD 402)
	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	Muta. 1B; May cause genetic defects. Harmonised Classification. ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1% benzene
	Carcinogenicity	Carc. 1B; May cause cancer. Harmonised Classification. ECHA Registration Endpoint summary: According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1% benzene
	Reproductive toxicity	Repr. 2; Suspected of damaging fertility or the unborn child. ECHA Registration Endpoint summary According to EU CLP Classification (EC no. 1272/2008), there is a regulatory requirement to classify gasoline and naphtha streams as hazardous for this endpoint when they contain >0.1% Toluene and/or n-hexane
	STOT - single exposure	STOT SE 3; May cause drowsiness or dizziness. Weight of evidence approach
	STOT - repeated exposure	Based upon the available data, the classification criteria are not met.
	Oral:	No adverse effect observed (rat) (Halder CA, et al. (1985))
	Inhalation:	No adverse effect observed (rat) (OECD 453) Chronic - Systemic effects NOAEC 1402 mg/m³
	Dermal:	No adverse effect observed. (mouse) (OECD TG 410) Chronic - Systemic effects NOAEL 375 mg/kg bw/day
	Aspiration hazard	Asp. Tox. 1; May be fatal if swallowed and enters airways. Harmonised Classification. Viscosity: 1 mm²/s @ 20 °C
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) 10 mg/l (OCED 203)
	Long Term (Chronic):	According to the EU CLP Regulation (EC No. 1272/2008) criteria, substances in the low boiling point naphtha category are classified as Chronic Category 2 (H411) for the environment based on acute invertebrate and alga toxicity.
12.2	**Persistence and degradability**	Readily biodegradable. (OECD 301F)
12.3	**Bioaccumulative potential**	Substance is complex UVCB. The BCF (fish) of this substance components is well below the criteria for bioaccumulation. Therefore, this substance is not considered as bioaccumulative substance. (ECHA registration dossier: PBT assessment 2)
12.4	**Mobility in soil**	The product is predicted to have low mobility in soil. Immiscible with water.
12.5	**Results of PBT and vPvB assessment**	Substance is complex UVCB. This substance does not contain PBT constituents included in the SVHC candidate list at concentrations above 0.1%.
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: 13 07 01

SECTION 14: TRANSPORT INFORMATION

		ADR/RID	IMDG/ADN
14.1	**UN number**	UN 1268	UN 1268
14.2	**Proper Shipping Name**	PETROLEUM DISTILLATES N.O.S.	PETROLEUM DISTILLATES N.O.S.
14.3	**Transport hazard class(es)**	3	3+(N2,CMR,F)
14.4	**Packing group**	I	I
14.5	**Environmental hazards**	MILEUGEVAARLIJK / ENVIRONMENTALLY HAZARDOUS / UMWELTGEFÄHRDEND / DANGEREUX POUR L'ENVIRONNEMENT	
14.6	**Special precautions for user**	Vapour may create explosive atmosphere. The vapour is heavier than air; beware of pits and confined spaces.	
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**	ADR HIN: 33 Tunnel Restriction Code: 1 (D/E) Limited Quantity: 500 ml	EmS: F-E, S-E Limited Quantity: 500ml

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

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

Sections indicated with the following have been revised
Header and Section 1.3

Updated version and date. New SDS Regulation 2015/830 format, all sections have been updated to include new information. Please review SDS with care.

References:
Existing ECHA registration(s) for Gasoline (CAS No. 86290-81-5) and Chemical Safety Report.

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

Literature References:

1. Halder CA, et al., 1985, Hydrocarbon nephropathy in male rats: identification of the nephrotoxic components of unleaded gasoline., Toxicol. Ind. Health 1:67-87

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
ES	Exposure Scenario
NOAEC	no observed adverse effect concentration
NOAEL	No Observed Adverse Effect Level

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

Disclaimers

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Annex to the extended Safety Data Sheet (eSDS)

See below -

Gasoline (0 -1% benzene content)

CAS Number 86290-81-5
EC Number 289-220-8

Summary of Parameters

Physical Parameters			
Vapour pressure (Pa)			4 – 240 @ 37.8 °C (Value used for exposure assessment = 340)
Partition Coefficient (log K_{OW})			2.00 - 20.43
Aqueous solubility (mg L^{-1})			1.6E+03 - 5.1E-18 (Value used for exposure assessment = 2.0E+02)
Molecular weight			Not applicable
Biodegradability			Not defined
Human health Parameter (DNELs)			
Worker	Short term	Inhalation (mg/m³)	1100
		Dermal (mg/kg bw/day)	Not applicable
	Long Term	Inhalation (mg/m³)	3.2 (= 1 ppm)*
		Dermal (mg/kg bw/day)	0.234*
Consumer		Inhalation (mg/m³)	0.0032 (=1 ppb)* (0.93 mg/kg bw/day)
		Dermal (mg/kg bw/day)	0.234*
		Oral (mg/kg^{-1} bw/day^{-1})	8.8
Environmental Parameter (PNECs)			
Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.			

* Concentration: benzene (Worst case assumption. Contains benzene. @1%).

Table of Contents

Contributing Scenarios

Workers	
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
PROC2 (Storage)	Use in closed, continuous process with occasional controlled exposure. Bulk product storage.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC3 (Sampling)	Use in closed, continuous process with occasional exposure. Sample collection
PROC8a (Maintenance)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Clean down and maintenance of vessels and containers.
PROC8b (Bulk)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Bulk transfer in a closed system
PROC8b (Drum)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Drum or batch transfers.
PROC8b (Refueling)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Refueling vehicles, light aircraft or marine craft
PROC8b (aircraft)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Refueling aircraft
PROC15	Use as laboratory reagent.
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected.
PROC16 (Additive)	Using material as fuel sources, limited exposure to unburned product to be expected. Use as a fuel additive.
Environment	
ERC1	Manufacture of substance
ERC2	Formulation of preparations
ERC3	Formulation in materials
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 thermoplastics
ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
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 (Automotive refueling) (Scooter refueling) (Garden equipment refueling) (Garden equipment use)

Exposure Scenario 1 – Distribution of gasoline (0 – 1 % benzene content)

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) PROC8a (Maintenance) PROC8b (Bulk) PROC15
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC1 ERC2 ERC3 ERC4 ERC5 ERC6a ERC6b ERC6c ERC6d ERC7
Specific Environmental Release Categories SPERC	ESVOC SpERC 1.1b v.1

2.0 Operational conditions and risk management measures		
2.1 Control of worker exposure		
Product characteristics		
Physical form of product	Liquid with high volatility.	
Concentration of substance in product	Covers concentrations up to 100% (≤ 1 % benzene content)	
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).	
Frequency of use (days per year)	300	
Other operational conditions affecting worker exposure		
Area of use	PROC3, PROC2 (Storage)	Outdoor
	All other PROC's	Not defined (default = Indoor)
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
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 measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical conditions of use		
PROC1, PROC2, PROC3	Handle substance within a closed system.	
PROC8b (Bulk)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 90 %)	
PROC15	Use fume cupboard. (Efficiency of at least 90 %)	
Organisational measures		
PROC3 (Sampling)	Sample via a closed loop or other system to avoid exposure. (Efficiency of at least 95 %)	
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Inhalation - efficiency of at least 90 %)	

Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC2	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.	
Other operational conditions affecting worker exposure		
Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:	0.1	
Regional use tonnage (tons/year):	1.11E+07	
Fraction of Regional tonnage used locally: tons/year	2.0E-03	
Annual site tonnage (tons/year):	21,202	
Average daily use (kg/day)	70,675	
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	
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	
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	
If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	0	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0	
Treat soil emission to provide a typical removal efficiency of (%):	0	
Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.		
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	
Degradation effectiveness (%)	96.1	
Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations.		
Substance release quantities after risk management measures		
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	2.58E+06	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA (benzene content)

Process category [PROC]	Inhalation		Dermal		Combined
	inhalation exposure (mg/m^3)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.57	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC3 (Sampling)	0.05	0.05	0.03	0.15	0.20

PROC8a (Maintenance)	0.25	0.25	0.14	0.57	0.84
PROC8b (Bulk)	0.15	0.15	0.07	0.30	0.45
PROC15	0.05	0.05	0.00	0.01	0.06

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.

Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	1.44 mg/L	5.06E-03 mg/L	1.45E-04 mg/L	1,68E-4 mg/kg ww	9.88E-03 mg/kg ww	9.88E-04 mg/kg ww
Risk characterisation ratio (RCR)	1.64E-03	2.74E-02	7.50E-04	7.99E-05	9.98E-03	9.93E-03

Human exposure prediction:

Route of Exposure	Exposure ($\mu g/kg^{-1}$ day^{-1})	Risk characterisation ratio (RCR)
Oral	0.36	3.62E-03
Inhalation	5.66	6.10E-3

4.0 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 calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene	
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 of gasoline (0 – 1 % benzene content)

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) PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC15
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC2
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 high volatility.	
Concentration of substance in product	Covers concentrations up to 100% (≤ 1 % benzene content)	
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).	
Frequency of use (days per year)	300	
Other operational conditions affecting worker exposure		
Area of use	PROC3	Outdoor
	All other PROC's	Not defined (default = Indoor)
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
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 measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical conditions of use		
PROC1, PROC2, PROC2 (Storage), PROC3	Handle substance within a closed system.	
PROC3 (Sampling)	Sample via a closed loop or other system to avoid exposure. (Efficiency of at least 95 %)	
PROC8b (Bulk), PROC8b (Drum/batch transfers)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 97 %)	
PROC15	Use fume cupboard. (Efficiency of at least 90 %)	
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 90 %)	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC2, PROC2 (Storage)	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.
Other operational conditions affecting worker exposure	
Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.	
2.2 Control of environmental exposure	
Amounts used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tons/year):	9.97E+06
Fraction of Regional tonnage used locally: (tons/year)	3.0E-03
Annual site tonnage (tons/year):	3.0E+04
Average daily use (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
Release fraction to air from process (initial release prior to RMM):	2.5E-02
Release fraction to wastewater from process (initial release prior to RMM):	6.4E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
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
If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	95.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0
Treat soil emission to provide a typical removal efficiency of (%):	0
Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
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
Degradation effectiveness (%)	96.1
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Substance release quantities after risk management measures	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (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 (benzene content)

Process category [PROC]	Inhalation		Dermal		Combined
	inhalation exposure (mg/m^3)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.50	0.50	0.03	0.12	0.62
PROC3	0.70	0.70	0.03	0.15	0.85
PROC3 (Sampling)	0.05	0.05	0.03	0.15	0.20
PROC8a (Maintenance)	0.25	0.25	0.14	0.59	0.84
PROC8b (Bulk)	0.05	0.05	0.07	0.30	0.35
PROC8b (Drum/batch transfers)	0.05	0.05	0.07	0.30	0.35
PROC15	0.05	0.05	0.00	0.01	0.06

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.

Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	1.31E+00 mg/L	1.32E-01 mg/L	1.32E-02 mg/L	1.67E-03 mg/kg ww	9.00E-01 mg/kg ww	9.00E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.49E-01	6.83E-01	6.83E-02	4.99E-03	9.09E-01	9.09E-02

Human exposure prediction:

Route of Exposure	Exposure ($\mu g/kg^{-1}$ day^{-1})	Risk characterisation ratio (RCR)
Oral	7.79	7.79E-02
Inhalation	165	1.78E-01

4.0 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 calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene	
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 of Gasoline (0 – 1 % benzene content) 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 PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC8b (refuelling) PROC8b (refuelling aircraft) PROC16 PROC16 (Additive)
Chemical product category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC7
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 high volatility.	
Concentration of substance in product	Covers concentrations up to 100% (≤ 1 % benzene content)	
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).	
Frequency of use (days per year)	300	
Other operational conditions affecting worker exposure		
Area of use	PROC3	Outdoor
	All other PROC's	Not defined (default = Indoor)
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
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 measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical conditions of use		
PROC1, PROC2, PROC2 (Storage), PROC3, PROC16, PROC16 (Additive)	Handle substance within a closed system.	
PROC8b (Bulk), PROC8b (Drum/batch transfers), PROC8b (refuelling), PROC8b (refuelling aircraft)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 90 %)	
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 86 %)	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC2	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.	
Other operational conditions affecting worker exposure		
Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:	0.1	
Regional use tonnage (tons/year):	9.38E+05	
Fraction of Regional tonnage used locally: (tons/year)	1	
Annual site tonnage (tons/year):	9.38E+05	
Average daily use (kg/day):	3.13E+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	
Release fraction to air from process (initial release prior to RMM):	5.00E-02	
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	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Treat air emission to provide a typical removal efficiency of (%):	95.0	
If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	91.1	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0	
Treat soil emission to provide a typical removal efficiency of (%):	0	
Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.		
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	
Degradation effectiveness (%)	96.1	
Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations.		
Substance release quantities after risk management measures		
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	5.30E+06	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA (benzene content)

Process category [PROC]	Inhalation		Dermal		Combined
	inhalation exposure (mg/m^3)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.59	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC8a (Maintenance)	0.35	0.35	0.14	0.59	0.94
PROC8b (Bulk)	0.09	0.09	0.07	0.30	0.39
PROC8b (Drum/batch transfers)	0.15	0.15	0.07	0.30	0.45
PROC8b (refuelling)	0.15	0.15	0.07	0.30	0.45

PROC8b (refuelling aircraft)	0.15	0.15	0.07	0.30	0.45
PROC16	0.25	0.25	0.03	0.15	0.40
PROC16 (Additive)	0.25	0.25	0.03	0.15	0.40

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.

Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	6.39E-01 mg/L	6.40E-02 mg/L	6.40E-02 mg/L	5.07E-03 mg/kg ww	4.37E-01 mg/kg ww	4.37E-02 mg/kg ww
Risk characterisation ratio (RCR)	7.24E-02	3.32E-01	3.32E-02	1.52E-02	4.41E-01	4.41E-02

Human exposure prediction:

Route of Exposure	Exposure ($\mu g/kg^{-1}$ day^{-1})	Risk characterisation ratio (RCR)
Oral	3.90	3.90E-02
Inhalation	511	5.51E-01

4.0 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 calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene	
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 of Gasoline (0 – 1 % benzene content) 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 PROC2 (Storage) PROC3 PROC8a (Maintenance) 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 ERC9b
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 high volatility.	
Concentration of substance in product	Covers concentrations up to 100% (≤ 1 % benzene content)	
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).	
Frequency of use (days per year)	300	
Other operational conditions affecting worker exposure		
Area of use	PROC3	Outdoor
	All other PROC's	Not defined (default = Indoor)
Characteristics of the surroundings	Not defined	
General measures applicable to all activities Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).		
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 measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical conditions of use		
PROC1, PROC2, PROC2 (Storage), PROC3, PROC16	Handle substance within a closed system.	
PROC2 (Storage)	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Efficiency of at least 30 %)	
PROC8b (Bulk), PROC8b (Drum/batch transfers), PROC8b (refuelling)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 90 %)	
Organisational measures		
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately. (Efficiency of at least 83 %)	
Risk management measures related to human health		
Respiratory protection	No special measures are required.	
Hand and/or Skin protection	PROC2	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 98 %)
Eye Protection	No special measures are required.	
Other operational conditions affecting worker exposure		
Wear suitable coveralls to prevent exposure to the skin. Clear transfer lines prior to de-coupling. Avoid dip sampling.		
2.2 Control of environmental exposure		
Amounts used		
Fraction of EU tonnage used in region:	0.1	
Regional use tonnage (tons/year):	8.85E+05	
Fraction of Regional tonnage used locally: (tons/year)	5.0E-04	
Annual site tonnage (tons/year):	442	
Average daily use (kg/day):	1211	
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):	1.0E-02	
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	
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	
If there is no discharge to domestic sewage treatment plant, Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	0m	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of >= (%)	0	
Treat soil emission to provide a typical removal efficiency of (%):	0	
Common practices vary across sites thus conservative process release estimates used. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.		
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	
Degradation effectiveness (%)	96.1	
Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations.		
Substance release quantities after risk management measures		
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	6.06E+04	

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA (benzene content)

Process category [PROC]	Inhalation		Dermal		Combined
	inhalation exposure (mg/m^3)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.00	0.00	0.03	0.15	0.15
PROC2	0.50	0.50	0.03	0.12	0.62
PROC2 (Storage)	0.35	0.35	0.14	0.59	0.94
PROC3	0.70	0.70	0.03	0.15	0.85
PROC8a (Maintenance)	0.85	0.85	0.03	0.12	0.97
PROC8b (Bulk)	0.25	0.25	0.07	0.30	0.55
PROC8b (Drum/batch	0.25	0.25	0.07	0.30	0.55

transfers)					
PROC8b (refuelling)	0.25	0.25	0.07	0.30	0.55
PROC16	0.50	0.50	0.03	0.15	0.65

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.

Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.48E-05 mg/L	3.64E-03 mg/L	1.42E-04 mg/L	2.18E-04 mg/kg ww	7.20E-03 mg/kg ww	3.60E-05 mg/kg ww
Risk characterisation ratio (RCR)	2.81E-05	2.00E-02	7.56E-05	1.99E-04	7.33E-03	3.59E-05

Human exposure prediction:

Route of Exposure	Exposure ($\mu g/kg^{-1}$ day^{-1})	Risk characterisation ratio (RCR)
Oral	2.79	2.79E-03
Inhalation	5.18	5.58E-03

4.0 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 calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene	
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 of Gasoline (0 – 1 % benzene content) 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 PC13 (Automotive refueling) PC13 (Scooter refueling) PC13 (Garden equipment refueling) PC13 (Garden equipment use)
Article Categories [AC]	Not applicable
Environmental release categories [ERC]	ERC9a ERC9b
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 with high volatility.		
Concentration of substance in product	Covers concentrations up to 100% (≤ 1 % benzene content)		
Human factors not influenced by risk management			
Potential exposure area (Skin Contact)	PC13	Automotive refueling; Scooter refueling	210 cm²
		Garden equipment use; Garden equipment refueling	420 cm²
Frequency and duration of use			
Exposure duration (hours/Event)	PC13	Automotive refueling; Scooter refueling	0.05
		Garden equipment use	0.03
		Garden equipment refueling	2.00
Frequency of use (days per year)	PC13	Automotive refueling; Scooter refueling	52 (Covers frequency up to: weekly use)
		Garden equipment use; Garden equipment refueling	26 (Covers frequency up to: once in two weeks.)
Amounts used (g/Event)	PC13	Automotive refueling	37500
		Scooter refueling	3750
		Garden equipment use; Garden equipment refueling	750
Other operational conditions affecting worker exposure			
Area of use	Not defined		
Characteristics of the surroundings	PC13	Automotive refueling; Scooter refueling; Garden equipment use	Outdoor
		Garden equipment refueling	34 m³
Risk Management Measures			
Respiratory protection	No specific measures identified.		
Hand and/or 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):	8.15E+06
Fraction of Regional tonnage used locally: (tons/year)	5.0E-04
Annual site tonnage (tons/year):	4.08E+03
Average daily use (kg/day):	1.12E+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-02
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
Conditions and measures related to municipal sewage treatment plant	
Size of municipal sewage system/treatment plant (m^3/d)	2000
Degradation effectiveness (%)	96.1
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Substance release quantities after risk management measures	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	5.31E+05

3. Exposure estimation and reference to its source

3.1 Human exposure prediction

Exposure assessment (method/calculation model)	ECETOC TRA (benzene content)

Yearly Use (Chronic)

Chemical product category [PC]	Inhalation		Dermal		Combined
	inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PC13 (Automotive refueling)	0.002	0.69	0.00	0.01	0.70
PC13 (Scooter refueling)	0.001	0.46	0.00	0.01	0.47
PC13 (Garden equipment use)	0.003	0.87	0.00	0.00	0.87
PC13 (Garden equipment refueling)	0.001	0.18	0.00	0.02	0.20

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.

Gasoline is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance As the model assumes fractionation before entering the environment, the PEC is not of the substance as manufactured but is a some of the constituents expected to be present in the environmental compartment.

Environmental exposure	STP	freshwater	marine water	Soil	freshwater sediment	marine sediment
Predicted Environmental Exposure (PEC)	2.28E-03 mg/L	3.85E-03 mg/L	2.29E-05 mg/L	5.04E-04 mg/kg ww	8.59E-03 mg/kg ww	1.56E-04 mg/kg ww
Risk characterisation ratio (RCR)	2.59E-04	2.10E-02	1.18E-04	1.24E-03	8.73E-03	1.58E-04

Human exposure prediction:

Route of Exposure	Exposure (µg/kg^{-1} day^{-1})	Risk characterisation ratio (RCR)
Oral	0.30	2.95E-03
Inhalation	5.18	5.58E-03

4.0 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 calculated for benzene and assumes that the substance contains 1 % benzene. Arithmetic scaling may be possible if the batch contains < 1 % benzene

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

Shell & MOH Aviation

AVIATION FUEL (JET A-1, JP-5, JP-8, AN-8)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1. Product identifier

Commercial name:	**AVIATION FUEL (JET A-1, JP-5, JP-8, AN-8)**
Substance name:	n/a (mixture)
EINECS Number:	n/a (mixture)
Registration Number (EC Regulation 1907/2006):	n/a (mixture)
CAS Number:	n/a (mixture)

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

Intended use:	Manufacture (industrial), distribution (industrial), formulation and (re)packing (industrial). Use as a fuel (professional, consumer)

1.3. Details of the supplier of the Safety Data Sheet

Manufacturer	MOTOR OIL (HELLAS), CORINTH REFINERIES S.A
Supplier:	Shell & MOH Aviation Fuels A.E.
Address:	151, Kifissias Ave, Maroussi, 151 24, Greece
Telephone number:	+30 210 6006 380-1
Fax number:	+30 210 6083 820
e-mail address:	info@shell-moh.com
e-mail contact for MSDS:	If you have any enquiries about the content of this MSDS, please email: ops@shell-moh.com

1.4. Emergency telephone number

National emergency centre:	166
National poison centre:	+30 210-7793777

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) 1272 /2008 [CLP]

Flam. Liquid 3	H226
Skin Irrit. 2	H315
Asp.Tox. 1	H304
STOT Single Exp. 3	H336
Aquatic Chronic 2	H411

2.1.2. Additional information

No additional information available.

2.2. Label elements

2.2.1. Labelling according to Regulation (EC) 1272/2008 [CLP]

Hazard pictogram (CLP):

Signal word: Danger

Hazard statements:

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statements:

P102	Keep out of reach of children.
P210	Keep away from heat/sparks/open flames/.../hot surfaces. ... No smoking.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/ face protection.
P331	Do NOT induce vomiting.
P301+ P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

2.3. Other hazards

The substance is not considered to be PBT nor vPvB.

3. COMPOSITION INFORMATION ON INGREDIENTS

CAS No	EC No	Index No	REACH Registration No	% weight	Name	Classification according to Regulation EC 1272/2008 (CLP)
91770-15-9	294-799-5	649-427-00-X	01-2119502385-46-0057	99.85-100	Kerosine (petroleum), sweetened; Kerosine - unspecified	Flam. Liquid 3; H226 Skin Irrit. 2; H315 Asp. Tox. 1; H304 STOT Single Exp.3; H336 Aquatic Chronic 2; H411
111-77-3	203-906-6	603-107-00-6	01-2119475100-52-XXXX	0-0.15	2-(2-Methoxy ethoxy) ethanol	Repr. Cat. 2; H361d

May also contain additives at <0.1% v/v each.

4. FIRST AID MEASURES

4.1. Description of first aid measures

General notes:
Spillages make surface slippery.
Before attempting to rescue casualties, isolate area from all potential sources of ignition including disconnecting electrical supply.
Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces.
Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity.
(Subject to applicability) Hydrogen sulphide (H_2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

Inhalation:
Inhalation is unlikely because of the low vapour pressure of the substance at ambient temperature. Exposure to vapours may however occur when the substance is handled at high temperatures with poor ventilation.
If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
If the casualty is unconscious and:
* Not breathing – ensure that there is no obstruction to breathing and give artificial respiration by trained personnel. If necessary, give external cardiac massage and obtain medical assistance.
* Breathing - place in the recovery position and keep the head below the level of the torso. Administer oxygen if necessary;

Obtain medical attention if casualty has an altered state of consciousness or if symptoms do not resolve.
(Subject to applicability) If there is any suspicion of inhalation of H_2S:
* Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.
* Remove casualty to fresh air as quickly as possible.
* Immediately begin artificial respiration if breathing has ceased.
* Provision of oxygen may help.
* Obtain medical advice for further treatment.

Skin contact:
Remove contaminated clothing and footwear, and dispose of safely.
Wash affected area with soap and water.
Seek medical attention if skin irritation, swelling or redness develops and persists.
When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention. Do not wait for symptoms to develop.
For minor thermal burns: Cool the burn. Hold the burned area under cold running water for at least five minutes, or until the pain subsides. However, body hypothermia must be avoided.

Eye contact:
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.

Ingestion/Aspiration:
In case of ingestion, always assume that aspiration has occurred. The casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.
Do not induce vomiting, as there is high risk of aspiration.
Do not give anything by mouth to an unconscious person.

Self-protection of the first aider:
First aid personnel must be aware of personal risk during rescue. Use personal protective equipment. See section 8 for more detail.

4.2. Most important symptoms and effects, both acute and delayed

Following inhalation:	Inhalation of vapours may cause headache, nausea, vomiting and an altered state of consciousness
Following skin contact:	Reddening, irritation
Following eye contact:	Slight irritation (unspecific)
Following ingestion/ aspiration:	Few or no symptoms expected. If any, nausea and diarrhea might occur.

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

Treat accordingly depending on the type of exposure.

5. FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media:	Foam (Specifically trained personnel only) Water fog (Specifically rained personnel only) Dry chemical powder Carbon dioxide Other inert gases (subject to regulations) Sand or earth
Unsuitable extinguishing media:	Do not use direct water jets on the burning product; they could cause splattering and spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2. Special hazards arising from the substance or mixture

This substance will float and can be reignited on surface water.

Hazardous combustion products:

Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds. If sulfur compounds are present in appreciable amounts, combustion products may include also H_2S and SO_x (sulfur oxides) or sulfuric acid.

5.3. Advice for fire-fighters

Protective equipment for fire fighters:

In case of a large fire or in confined or poorly ventilated spaces wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

General information

Stop or contain leak at the source, if safe to do so. Avoid direct contact with released material. Stay upwind. In case of large spillages, alert occupants in downwind areas.

Keep non-involved personnel away from the area of spillage. Alert emergency personnel. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.
Eliminate all ignition sources, if safe to do so (e.g. electricity, sparks, fires, flares).
(Subject to applicability): In those cases when the presence of dangerous amounts of H_2S around the spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training.
If required, notify relevant authorities according to all applicable regulations.

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel:	Wear Personal Protective Equipment (PPE) listed in Section 8. Stand upwind from the spill site. Ensure adequate ventilation. Eliminate all ignition sources (electricity, sparks, fires, flares, smoking). Avoid contact with skin, eye and clothing.
6.1.2. For emergency responders:	Small spillages: normal antistatic working clothes are usually adequate. Large spillages: full body suit of chemically resistant and antistatic material. Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons. Note: gloves made of PVA are not water-resistant and are not suitable for emergency use. Work helmet. Antistatic non-skid safety shoes or boots. Goggles or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection: A half or full-face respirator with filter(s) for organic vapours (and when applicable for H_2S) or a Self Contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBAs should be used.

6.2. Environmental precautions

Spillages onto land: Prevent product from entering sewers, rivers, waterways or other bodies of water. Prevent product from contaminating soil or ground water system.

6.3. Methods and material for containment and cleaning up

6.3.1. For containment:	Spillages onto land: If necessary dike the product with dry earth, sand or similar non-combustible materials. Large spillages may be cautiously covered with foam, if available, to limit fire risk. Do not use direct jets. Spillages on water or at sea: In case of small spillages in closed waters (i.e. ports) contain product with floating barriers or other equipment. Large spillages in open waters should be contained with floating barriers or other mechanical means. Control the spreading of the spillage.
6.3.2. For cleaning up:	The use of dispersants should be advised by an expert and approved by local authorities. REMARK: in case of interior space (e.g. inside buildings or confined spaces) ensure adequate ventilation. Spillages onto land: Absorb spilled product with suitable non-combustible materials. Collect free product with suitable means and transfer collected product and other contaminated materials to suitable containers for recycle, recovery or safe disposal according to relevant regulations. In case of soil contamination, remove contaminated soil and treat this in accordance with local regulations.

Spillages on water or at sea: In case of small spillages, contain spilled product and collect it by absorbing with specific floating absorbents.
In case of large spillages in open waters collect the product by skimming or other suitable mechanical means, only if fire/explosion risks can be adequately prevented.
Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal according to relevant regulations.

6.3.3. Other information: Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken.
(Subject to applicability) Concentration of H_2S in tank headspaces may reach hazardous values, especially in case of prolonged storage. This situation is especially relevant for those operations, which involve direct exposure to the vapours in the tank.
(Subject to applicability) Spillages of limited amounts of products, especially in the open air when vapours will be usually quickly dispersed, are dynamic situations, which are unlikely to entail exposure to dangerous concentrations. As H_2S has a density greater than ambient air, a possible exception may regard the build-up of dangerous concentrations in specific spots, like trenches, depressions or confined spaces. In all these circumstances, however, the correct actions should be assessed on a case-by-case basis.

6.4. Reference to other sections

Personal Protective Equipment: See Section 8 for more details.
Waste Treatment: See Section 13

7. HANDLING AND STORAGE

General information:
A specific assessment of inhalation risks from the presence of H_2S in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases must be made to help determine controls appropriate to local circumstances.
The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

7.1. Precautions for safe handling

Prevention of fire: Risk of explosive mixtures of vapour and air. Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products, are followed.
Ground/bond containers, tanks and transfer/receiving equipment.
Use and store only outdoors or in a well-ventilated area.
Take precautionary measures against static electricity.
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools.
Keep away from heat/sparks/open flames/hot surfaces. – No smoking

Prevention of aerosol and dust generation: Do not use compressed air for filling, discharging, or handling operations.

Protection of the	Avoid release to the environment

environment:

Hygiene measures: Avoid contact with skin and eyes. Never siphon by mouth. Do not ingest. Avoid breathing vapours. Use personal protective equipment as required (see Section 8). For more information regarding protective equipment and operational conditions see Exposure Scenarios. Ensure that proper housekeeping measures are in place.
Contaminated materials should not be allowed to accumulate in the workplace and should never be kept inside the pockets. Keep away from food and beverages. Do not eat, drink or smoke while using this product. Wash the hands thoroughly after handling. Change contaminated clothes at the end of working shift.

7.2. Conditions from safe storage, including any incompatibilities

Technical measures and storage conditions: Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.
Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.
Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content and flammability. If sulphur compounds are suspected to be present in the product, check the atmosphere for H_2S content.
If the product is supplied in containers:

* Keep only in the original container or in a suitable container for this kind of product.
* Keep containers tightly closed and properly labeled. Protect from the sunlight.
* Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Open slowly in order to control possible pressure release.
* Empty containers may contain flammable product residues. Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.

Packing materials: Recommended materials: For containers, or container linings use mild steel, stainless steel.
Unsuitable materials: some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

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

Storage class: Category II according to national legislation (Ministerial Decision 34458/1990)

Further information on storage conditions: Store separately from oxidizing agents.

7.3. Specific end use(s)

See Exposure scenarios in the Annex

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Limit values:

National occupational exposure limit values: Not reported
National biological limit values: Not reported
International occupational exposure limit values:
Since no occupational exposure limit values are reported for kerosine CAS No 91770-15-9, the limits below that have been published for kerosine CAS No 8008-20-6*, have been considered appropriate for kerosene CAS No 91770-15-9 streams as well.

Substance	**Kerosine**			
Cas No	**8008-20-6**			
	Limit value - Eight hours		Limit value - Short term	
	ppm	mg/m³	ppm	mg/m³
Belgium		200		
Canada - Ontario		200 (1) (2)		
Ireland		100		
South Korea		200		
USA-NIOSH		100		

Remarks:
Canada-Ontario: (1) Jet fuels, as total hydrocarbon vapour (2) Application restricted to conditions in which there are negligible aerosol exposures

**CAS No 8008-20-6: Kerosine (petroleum); straight run Kerosine; a complex of HC produced by the distillation of crude oil. It consists of HC having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of 130 °C to 290 °C*

Substance	**2-(2-Methoxyethoxy)ethanol**			
Cas No	**111-77-3**			
	Limit value - Eight hours		Limit value - Short term	
	ppm	mg/m³	ppm	mg/m³
Austria	10	50,1		
Belgium	10	50,1		
Denmark	25 provisional			
European Union	**10**	**50,1**		
Finland	10	50		
France	*10*	*50,1*		
Germany (AGS)	10 (1)	50 (1)		
Hungary		50,1		
Ireland	10	15,1		
Italy	10	50,1		
Latvia	20	100		
Poland		50		
Spain	10	50,1		
The Netherlands		45		
United Kingdom	10	50,1		

Remarks:
European Union: Bold-type: Indicative occupational exposure limit value and limit value for occupational exposure
France: Italic type: Indicative statutory limit values
Germany (AGS): (1) Inhalable aerosol and vapour
Italy: Skin
Spain: Skin

8.1.2. Monitoring procedures:

Monitoring of the air in confined places using gas detectors to detect and monitor presence of H2S, oxygen deficient conditions and explosive atmospheres. Refer to BS EN 14042:2003 "Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents", BS EN 1127-1:2007 "Explosive atmospheres-explosion prevention and protection", ES EN 60079-0:2009 "Explosive atmospheres-equipment general requirements"

8.1.3. Exposure limit values for air contaminants formed when using the substance/mixture

Not reported

8.1.4. Derived No Effect Level (DNEL) and Predicted No Effect Concentration (PNEC)

DNEL Worker (industrial /professional)

Chemical name	Short term, systematic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Kerosines	Dermal (a)	Dermal (b)	Dermal (a)	Dermal (b)
	Inhalation (a)	Inhalation (a)	Inhalation (a)	Inhalation (a)

(a) No hazard identified for this route (data available)
(b) The data do not allow setting a DNEL

DNEL Consumer/General population

Chemical name	Short term, systematic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Kerosines	Dermal (a)	Dermal (b)	Dermal (a)	Dermal (b)
	Inhalation (a)	Inhalation (a)	Inhalation (a)	Inhalation (a)
			Oral: 19 mg/kg/24h	

(a) No hazard identified for this route (data available)
(b) The data do not allow setting a DNEL

PNEC

Substance is a hydrocarbon UVCB. Conventional methods of deriving PNECs are not appropriate for such complex substances.

8.1.5. Use of control banding approach

See Section 7 and 8.2

8.2. Exposure control

8.2.1. Appropriate engineering controls:
Storage and handling in closed systems. Use sealed systems as far as possible. Local exhaust ventilation is recommended.
Provide basic employee training to prevent/minimise exposure.
Hazard recognition and risk assessment should be conducted for each work. Confined space entry procedures should be followed (e.g. work permit, gas measurements etc). Do not enter empty storage tanks until measurements of available oxygen have been carried out.
Draining, flushing and/or purging of the equipment prior to any disassembly work.

8.2.2. Personal protection equipment:

	IF	PPE	STANDARD
Eye and face protection	Splashing is likely	Protective shield and /or safety goggles should be used	EN 166
Hand protection	There is potential for exposure	Impervious gloves	EN 374
Other skin protection	There is potential for exposure	Impervious protective clothing	EN 340
Respiratory protection	There is vapour formation	Full face masks with gas filters for organic vapours	EN 14387, EN 136, EN 137
Thermal Hazards	Large scale fires	Fire resistant coveralls with self-contained breathing apparatus	EN 340, EN 469, EN 1486, EN 137

8.2.3. Environmental exposure controls:
See sections 6, 7 and exposure scenarios in the Annex.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

(a)	Appearance	: Low viscosity, liquid (at 20 ^{0}C and 101.3 Kpa)
(b)	Odour	: Characteristic (hydrocarbon-like)
(c)	Odour threshold	: Not available
(d)	pH	: Not applicable
(e)	Melting point/freezing point	: Freezing point is below -20°C
(f)	Initial boiling point and boiling range	: 130-290 °C
(g)	Flash point	: The flash point is 29 - 70°C (CONCAWE 2010a) (EN ISO 2719, 13736 and ASTM D 9302a)
(h)	Evaporation rate	: Not available
(i)	Flammability (solid, gas)	: Not applicable
	Flammability (liquid)	: Flammable liquid (cat.3)
(j)	Upper/lower flammability or explosive limits	: Not applicable
(k)	Vapour pressure	: The vapour pressure for kerosines ranges from <1 kPa to 3.7 kPa at 37.8 °C
(l)	Vapour density	: Not available

(m) Density at 15oC : The absolute density ranges from 0.77 to 0.85 g/cm3 at

		15 ^{0}C (CONCAWE, 2010a),(ASTM D-4052, EN ISO 12185)
(n)	Solubility in water	: Not applicable
(o)	Partition coefficient: n-octanol/water	: Not applicable
(p)	Auto-ignition temperature	: 220°C to 550°C (ASTM E 659 test method)
(q)	Decomposition temperature	: Not available
(r)	Viscosity	: 1 to 2.4 cSt at 40°C
(s)	Explosive properties	: Not applicable
(t)	Oxidising properties	: Not applicable

9.2. Other information

No information available

10. STABILITY AND REACTIVITY

10.1. Reactivity

No information available

10.2. Chemical stability

Stable under recommended handling and storage conditions

10.3. Possibility of hazardous reactions

None when treated according to provisions

10.4. Conditions to avoid

Avoid flammability hazards and potential ignition and heat sources (extremely high temperatures, heat sources, open flames, static electricity, sparks)

10.5. Incompatible materials

Strong oxidizing agents. Strong acids. Strong bases. Halogens.

10.6. Hazardous decomposition products

Does not decompose when used for intended uses.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Basis of assessment: Information given is based on product data, knowledge of the components and the toxicology of similar products. The results are based on the available studies and support the classification.

Acute toxicity	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	Equiv. or similar to OECD 420	Rat (Sprague Dawley) male, female	**Oral** Gavage	5000mg/kg bw	single dose, 14days	LD50 >5000mg/kg bw
	Equiv. or similar to OECD 402	Rabbit (New Zealand White) male, female	**Dermal** Occlusive coverage	2000mg/kg bw	single dose, 24 hours to 10% of their body surface area	LD50 >2000mg/kg bw
	Equiv. or similar to OECD 403	Rat (Sprague-Dawley), male, female	**Inhalation,** Vapour, whole body	5.28 mg/L air	4 h	LC50 >5280 mg/m3 air
	Based on evaluation of all the acute toxicity data discussed above, kerosine does not meet the criteria for classification as an acute oral, inhalation or dermal toxicant under the EU CLP Regulation (EC No. 1272/2008).					

Skin Irritation	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	Equivalent or similar to OECD 404	Rabbit (New Zealand white)	**Skin**	Semi-occlusive coverage (saved) to 0.5mL of kerosene Test material: odourless kerosine	4 h	Not -irritating
	EPA Guidelines in FR vol.44, No.145	"	"	Occlusive coverage (intact and abraded skin sites) to 0.5mL of kerosene Test material: kerosine/ heating oil	24 h	Irritating
	Based on the overall weight of evidence of skin irritation scores, kerosines are classified as irritating to the skin as defined by EU CLP Regulation (EC No 1272/2008). They are classified as Skin Irritant, Category 2 (H315), irritating to the skin.					

Serious eye damage/ irritation	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	EPA OTS 798:4500	New Zealand Rabbit, white	**Eye**	0.1mL of was instilled in the conjunctival sac of the eye Test material: Kerosine, CAS No 68333-23-3	72 hours observation	Not irritating
	Based on a lack of corneal, iridial, and conjunctival irritation, kerosines do not meet the criteria for classification as an eye irritant as defined by EU CLP Regulation.					

Corrosivity	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	No specific studies have been reported on corrosivity of these substances in this category. Considering the available studies, no corrosive action of these substances is expected.					

Respiratory or skin sensitisation	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	Equiv. or similar to OECD 406	Guinea pig (Hartley), male	**Skin** Induction and Challenge: epicutaneous, occlusive	Induction: 1:4 dilution Challenge: 1:4 dilution or 0.2% DNCB Test material: Kerosine , CAS No 68333-23-3		Not sensitizing

	Skin sensitisation: Based on test data, kerosines do not meet the criteria for classification as a dermal sensitizer under EU CLP Regulation (EC No. 1272/2008). Respiratory sensitization: This endpoint is not a REACH requirement

Germ cell mutagenicity	Method	Species	Route of exposure	Effective dose	Exposure time	Results
	IN VITRO Modified Ames assay	S.Typhimurium 98		50 µl/ml Test material: CAS No 64742-81-0 and 8008-20-6		All in vitro assays were negative for genotoxicity, except for one assay done with straight run kerosine which was positive
	Equiv. or similar to OECD 471	S.Typhimurium TA 1535,1537, 1538, 98, 100 and S. Cerevisiae D4 (met. act. with and without		0.001-5.0 µl/plate Test material: CAS No 8008-20-6		
	Equiv. or similar to OECD 476	Mouse lymphoma L5178Y cells (met. act. with and without)		-3.91-6.25 nl/ml (with activation) and 6.25-37.5 nl/ml (without activation) -0.004-0.065 nl/ml (with activation) and 0.006-0.13 nl/ml (without activation) Test material: CAS No 8008-20-6		
	IN VIVO Equiv. or similar to OECD 475	Rat (Sprague-Dawley), m, f	**Intraperitoneal**	- 0, 0.3, 1.0, 3.0 g/kg Test material: CAS No 8008-20-6 -0.3, 1.0, 3.0 g/kg Test material: CAS No 64742-81-0		
	"	"	"	Sample1: 0.4, 0.13, 0.04 ml/rat Sample2: 0.18, 0.06, 0.02 ml/rat Test material: CAS No 8008-20-6		
	Equiv. or similar to OECD 478	Mouse (CD-1), male	**Inhalation**	Actual: 0, 98.4, 378.3 ppm Test material: JF-A		All in vivo chromosome aberration and dominant lethal assays were negative for genotoxicity (OECD 475, 478), while one in vivo sister chromatid exchange assay (modified OECD 479) was positive for genotoxicity in male, but not in female mice.
	"	Mouse and rat, male	**Intraperitoneal**	Mouse: 1ml/kg (diluted 10% in corn oil), Rat: undiluted Test material: Deodorized kerosine		
	Equiv. or similar to OECD 479	Mouse (B6C3F1) male, female	"	400, 2000, 4000 mg/kg Test material: CAS No 64742-81-0		
	There were no studies located that described mutagenic or genotoxic effects of kerosine or jet fuels in humans. Because most studies were negative and the data on various individual components of kerosines and jet fuels were negative, the weight of evidence from in vitro and in vivo mutagenic studies indicates that kerosine and jet fuels are likely not mutagens and are not classified as mutagens under the EU CLP Regulation (EC No. 1272/2008).					

Carcinogenicity	Method	Species	Route of exposure	Effective dose	Exposure time	Results

	Equiv. or similar to OECD 451	Mouse (C3H/ HeNCrlBR), male	**Dermal**	37.5 µl Test material: JF-A	2 years, twice each week	Neoplastic effects: Yes
	"	Mouse (C3H), male, female	"	25 mg Test material: JF-A	105 weeks, 3 times weekly	"
	"	Mouse (C3H), male	"	50 µl Test material: CAS No 8008-20-6	24 months, twice weekly	"
	"	Mouse (C3H/ HeJ), m,f	"	50 µl Test material: CAS No 64742-81-0	lifetime, twice per week	"
	"	Mouse (B6C3F1), m,f	"	0, 250 or 500 mg/kg Test material: JP-5	103 w, except high dose- females were only exposed for 90 weeks (5 d/w)	"
	"	Mouse (C3H), male	"	0, 28.5, 50, 100% Test material: CAS No 64742-81-0	2 years (low dose 7d/w, mild dose 4d/w, high dose 2d/w	"
	"	"	"	50 gr/mouse Test material: CAS No 8008-20-6, 64742-47-8	2 years, twice per week	"
	Kerosine is not carcinogenic when animals are exposed via the oral or inhalation route. However, chronic skin contact with kerosines and jet fuel may lead to tumour formation as a consequence of repeated cycles of irritation, skin damage and repair. LOAEL: 200 mg/ kg bw/day - Target organs: other: skin In studies where dermal irritation and/or inflammation were prevented, but other factors, such as dermal uptake of polycyclic aromatic compounds, were kept identical, no skin tumours were observed. Based on this data, kerosines are classified as non-carcinogenic according to the EU CLP Regulation (EC No.1272/2008).					

Reproductive and developmental toxicity	**Method**	**Species**	**Route of exposure**	**Effective dose**	**Exposure time**	**Results**
	OECD 421	Rat (Sprague-Dawley), male, female	**Dermal**	165(20%), 330 (40%) 494(60%) mg/kg/d. Different concentrations in solution and amount applied Test material: CAS No 64742-81-0	14 d premating to day 20 of gestation with males treated an additional week	NOAEL (P, reprod.toxicity): ≥494 mg/kg bw/day NOAEL (F1, develop. offsrpring toxicity): ≥494 mg/kg bw/day
	No specific guidelines mentioned	Rat (Sprague-Dawley), male, female	**Oral** (gavage)	Males: 750, 1500,3000 mg/kg/d Females: 325, 750, 1500 mg/kg/d Test material: JP-8	Males: 70 to 90 days Females: 21 weeks	NOAEL (P): 750 mg/kg bw/day NOAEL (P, reprod.toxicity, male): ≥3000 mg/kg bw/day NOAEL (P, reprod.toxicity, female): ≥1500 mg/kg bw/day NOAEL (F1): 750 mg/kg bw/day

	OECD 414	Rat (Sprague-Dawley)	**Oral** (gavage)	500, 1000, 1500, 2000 mg/kg/day (actually ingested) Test material: JP-8	10 days	NOAEL (embryotoxicity): 1000 mg /Kg bw/day LOAEL (embryotoxicity): 1500 mg /Kg bw/day NOAEL (maternal toxicity): 500 mg /Kg bw/day LOAEL (maternal toxicity): 1000 mg /Kg bw/day
	OECD 414	Rat (Sprague-Dawley)	**Inhalation** Whole body	106 or 364 ppm Test material: CAS No 8008-20-6	Six hours each day (daily) Days 6 through 15 of gestation	NOAEC (maternal toxicity): ≥364ppm NOAEC (teratogenicity): ≥364ppm

- Kerosine does not cause fertility effects (OECD 421)
  NOAEL (oral route): ≥3000 mg/kg bw/day
  NOAEL (dermal route): ≥ 494 mg/kg bw/day
  NOAEL (inhalation): ≥ 1000 mg/kg bw/day
- All animal studies show that kerosine and jet fuel have no effects on developmental (OECD 414)
  NOAEL (oral route): 1000 mg/kg bw/day
  NOAEL (dermal route): ≥ 494 mg/kg bw/day
  NOAEL (inhalation): ≥ 364 ppm

Therefore, there is insufficient data to classify kerosines as toxic for reproduction under the EU CLP Regulation (EC No. 1272/2008).
Developmental studies did not provide sufficient evidence to cause a strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, therefore kerosines are not classified as a developmental toxicant according to EU CLP Regulation (EC No. 1272/2008).

Specific Target Organ Exposure (STOT) – repeated exposure	**Method**	**Species**	**Route of exposure**	**Effective dose**	**Exposure time**	**Results**
	Equiv. or similar to OECD 412	Rat (Sprague-Dawley), male, female	**Inhalation** Subacute **,** Vapour, whole body	24mg/m^3 (vapour) Test material: Kerosine, CAS No 64742-81-0	6h/d, 5d/w for 4w	NOAEC: ≥24 mg/m^3 air No treatment related effects observed
	Equiv. or similar to OECD 413	Rat (Fischer 344), male, female	**Inhalation** Subchronic Vapour, whole body	0, 500, 1000 mg/m^3 (vapour) Test material: JP-8	24h/d for 90 d	NOAEL: ≥1000mg/m^3 air LOAEL: 500 mg/m^3 (male, body and organ weights)
	"	Mouse (C57 BL) male, female	"	"	"	NOAEL: ≥1000mg/m^3 air
	OECD 410	Rat (Sprague-Dawley), male, female	**Dermal** Subacute	0.01, 0.05, 0.5 ml/kg/d Test material: Kerosine, CAS No 68333-23-3	6h/d, 5d/w for 4w	NOAEL: ≥0.5 ml/kgbw (male, female) Skin LOAEL: 0.01 ml/kgbw (male, female)
	Study (no specific guidelines)	Rat (Sprague-Dawley), male, female	**Oral** Subchronic, gavage	Males: 0, 750, 1500, 3000 mg/kg/d Females: 0, 325, 750, 1500 mg/kg/d Test material: JP-8	Males: 70 to 90 days Females: 21 w (daily)	NOAEL: 750 mg/kgbw/d

	• NOAEL (oral): 750 mg /Kg bw /day • NOAEL (dermal): ≥400 mg /Kg bw /day • NOAEC (inhalation): ≥1000 mg /Kg bw /day Based on the lack of adverse systemic effects even with the highest doses administered, kerosines are not classified for repeated dose toxicity under the EU CLP Regulation (EC No. 1272/2008).

STOT – single dose	**Method**	**Species**	**Route of exposure**	**Effective dose**	**NOAEL**	**Exposure time**
	Affected organs: Central Nervous System Route of exposure: Inhalation					

Aspiration Hazard	Due to low viscosity of kerosines aspiration is expected to occur only during ingestion or in case of vomiting after ingestion

12. ECOLOGICAL INFORMATION

Basis of assessment Information given is based on a knowledge of the components and the ecotoxicology of similar products.

12.1. Toxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Acute (short–term) Aquatic toxicity:

Fish LL50 (96h): 2 to 5 mg/L, NOEL(96h): 2.0 mg/L (Oncorhynchus mykiss, OECD 203; KS = 1)

Aquatic invertebrates EL50 (48h): 1.4 mg/L, NOEL(48h): 0.3 mg/L (Daphnia magna, OECD 202; KS = 1)

Chronic (long–term) Aquatic toxicity:

Fish NOEL: 0.098 mg/L (freshwater fish, PETROTOX computer model)

Aquatic invertebrates NOEL (21d): 0.48 mg/L, LOEL (21d): 1,2 mg/L, EL50(21d): 0.89 mg/L (Daphnia magna, OECD 211; KS = 1)

Toxicity to aquatic algae: NOEL (72h): 1.0 mg/L, EL50(72h): 1-3 mg/L (OECD 201; KS = 1)

Toxicity to microorganisms: LL50(72h): 677.9mg/L (Tetrahymena pyriformis, PETROTOX computer model)

Sediment and terrestrial toxicity: Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for the risk assessment of this complex substance.

Toxicity to birds: In accordance with Column 2 of REACH Annex X, studies on long-term or reproductive toxicity to birds studies do not need to be conducted due to the existence of a large mammalian dataset.

12.2. Persistence and degradability

Abiotic Degradation: Physical/photo-chemical	Hydrolysis Kerosines are resistant to hydrolysis because they lack a

elimination	functional group that is hydrolytically reactive. Phototransformation in air: Standard tests for atmospheric oxidation half-lives are intended for single substances and are not appropriate for this complex substance. Phototransformation in water and soil: The substance does not have the potential to undergo photolysis in water and soil.
Biodegradation:	Kerosines are not readily biodegradable, but as they can be degraded by micro-organisms, they are regarded as being inherently biodegradable.

12.3. Bio accumulative potential

The substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for the risk assessment of this complex substance.

12.4. Mobility

Known or predicted distribution to environmental compartments:	The distribution of the substance in the environmental compartments, air, water, soil, and sediment, has been calculated using the PETRORISK Model. Based on the regional scale exposure assessment, the multimedia distribution of the substance is 91.57 % to air, 1.54 % to water, 2.07 % to sediment and 4.82 % to soil.
Adsorption/Desorption:	The substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

12.5. Results of PBT and vPvB assessment

The substance is not considered to be PBT nor vPvB.

12.6. Other adverse effects

No information available

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Recover if possible. Dispose of in accordance with the European Directives on waste and hazardous waste. The waste producer is responsible for determining the proper EWC code, classification of the waste and disposal methods, based on the application for which the product was used.

13.1.1 Product / Packaging disposal:	Dispose empty containers via an authorized person/licensed waste disposal contractor in accordance with local and European regulations.

13.1.2 Waste treatment-relevant information:	Empty containers may retain product residue including flammable or explosive vapours. Empty and drain the container thoroughly, including all internal piping, traps, and standpipes. Removal of flammable material from vessels and/or containers may be done by steaming out. Do not perform any work (welding, cutting, drilling,, soldering) on an "empty" container unless they have been cleaned and declared safe. Do not pollute the soil, water or environment with the waste container.
13.1.3 Sewage disposal-relevant information:	DON'T pour the substance down the drain, down the storm sewer or on the ground. Product should not be disposed of by release to sewers.
13.1.4 Other disposal recommendations:	Where possible (e.g. in the absence of relevant contamination), recycling of used substance is feasible and recommended. Disposal should be in accordance with applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION

Land Transport (ADR/RID)

14.1. UN No:	UN 1863
14.2. UN Proper Shipping Name:	FUEL, AVIATION, TURBINE ENGINE
14.3. Transport Hazard class:	3 Flammable liquids
14.4. Packing Group:	I or II or III The correct choice of packaging group, hazard identification number (HIN) and UK emergency action code (EAC) will depend upon the closed flash point and initial boiling point of the low boiling point of the liquid being transported. The criteria are published in the transport regulations, but are summarised below. Initial boiling point <=35°C requires packaging group I, HIN 33, UK EAC 3YE. Flash point (closed cup) <23°C and Initial boiling point >35°C requires packaging group II, HIN 33, UK EAC 3YE. Flash point (closed cup) >= 23 to <= 60°C and Initial boiling point >35°C requires packaging group III, HIN 30, UK EAC 3Y. For UN 1863 substances belonging to packing group II, the special provisions in ADR, RID and ADN(R) differ depending upon whether the vapour pressure of the substance at 50°C is more than 110 kPa or not more than 110 kPa.
14.5. Environmental hazard:	This product is classified as dangerous to the environment
Remarks:	Hazard identification number (HIN) 30 or 33. UK Emergency action code (EAC) 3YE or 3Y. Tunnel restriction code: D/E (Note: ADR requirement only).

Inland waterways Transport (ADN)

14.1. UN No:	UN1863
14.2. UN Proper Shipping Name:	FUEL, AVIATION, TURBINE ENGINE
14.3. Transport Hazard class:	3 Flammable liquids
14.4. Packing Group:	I or II or III The correct choice of packaging group, hazard identification number (HIN) and UK emergency action code (EAC) will depend upon the closed flash point and initial boiling point of the low boiling point of the liquid being transported. The criteria are published in the transport regulations, but are summarised below. Initial boiling point <=35°C requires packaging group I, HIN 33, UK EAC 3YE. Flash point (closed cup) <23°C and Initial boiling point >35°C requires packaging group II, HIN 33, UK EAC 3YE. Flash point (closed cup) >= 23 to <= 60°C and Initial boiling point >35°C requires packaging group III, HIN 30, UK EAC 3Y. For UN 1863 substances belonging to packing group II, the special provisions in ADR, RID and ADN(R) differ depending upon whether the vapour pressure of the substance at 50°C is more than 110 kPa or not more than 110 kPa.
14.5. Environmental hazard:	This product is classified as dangerous to the environment

Remarks: Substance transported by inland waterway in a tank vessel may have a different classification to substance being transported in packaging by inland waterway.

Sea transport (IMDG Code)

14.1. UN No: UN 1863

14.2. UN Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE

14.3. Transport Hazard class: 3 Flammable liquids

14.4. Packing Group: I or II or III

The correct choice of packaging group, hazard identification number (HIN) and UK emergency action code (EAC) will depend upon the closed flash point and initial boiling point of the low boiling point naphtha being transported. The criteria are published in the transport regulations, but are summarised below.
Initial boiling point <=35°C requires packaging group I, HIN 33, UK EAC 3YE.
Flash point (closed cup) <23°C and Initial boiling point >35°C requires packaging group II, HIN 33, UK EAC 3YE.
Flash point (closed cup) >= 23 to <= 60°C and Initial boiling point >35°C requires packaging group III, HIN 30, UK EAC 3Y.
For UN 1863 substances belonging to packing group II, the special provisions in ADR, RID and ADN(R) differ depending upon whether the vapour pressure of the substance at 50°C is more than 110 kPa or not more than 110 kPa.

14.5. Environmental hazard: Marine pollutant

Air Transport (IATA)

14.1. UN No: UN 1863

14.2. UN Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE

14.3. Transport Hazard class: 3 Flammable liquids

14.4. Packing Group: I or II or III

The correct choice of packaging group, hazard identification number (HIN) and UK emergency action code (EAC) will depend upon the closed flash point and initial boiling point of the low boiling point of the liquid being transported. The criteria are published in the transport regulations, but are summarised below.
Initial boiling point <=35°C requires packaging group I, HIN 33, UK EAC 3YE.
Flash point (closed cup) <23°C and Initial boiling point >35°C requires packaging group II, HIN 33, UK EAC 3YE.
Flash point (closed cup) >= 23 to <= 60°C and Initial boiling point >35°C requires packaging group III, HIN 30, UK EAC 3Y.
For UN 1863 substances belonging to packing group II, the special provisions in ADR, RID and ADN(R) differ depending upon whether the vapour pressure of the substance at 50°C is more than 110 kPa or not more than 110 kPa.

14.5. Environmental hazard: This product is classified as dangerous to the environment

14.6. Special precautions for user

Refer to Section 7, Handling and Storage

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

For bulk transport follow Annex II of MARPOL 73/78 and the IBC Code

15. REGULATORY INFORMATION

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

EU Regulations

- Regulation (EC) No 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
- Regulation (EC) No 1272/2008 of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- Regulation (EC) No 453/2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- Regulation (EC) No 830/2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Authorisations and/or restrictions on use

- Authorisations: REACH Regulation Annex XIV – List of substances subject to authorisation
- Restrictions on use: REACH Regulation Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Other EU regulations

- Directive 2008/98/EC of 19 November 2008 on waste and repealing certain Directives
- Directive 2012/18/EK of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and consequently repealing Directive 96/82/EC.
- Directive 2001/7/EC of 29 January 2001 adapting for the third time to technical progress Council Directive 94/55/EC on the approximation of the laws of the Member States with regard to the transport of dangerous goods by road
- Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental viability with regard to the prevention and remedying of environmental damage
- Directive 2004/37/EC of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.
- Directive 2009/161 establishing a third list of indicative exposure limit values in implementation of Directive 98/24/EK and amending Directive 2000/39/EK

National regulations

- Ministerial Decree 13588/725/2006 «Measures, terms and restrictions for handling hazardous wastes according to the Directive 91/689/EEC for hazardous waste» Replacement of the Ministerial Decree 19396/1546/1997 «Measures and terms for handling hazardous waste»
- Presidential Decree 307/1986 «Protection of Workers from the Risks Related to Exposure to Certain Chemical Agents at Work», as it has been amended by:
  - P.D. 77/1993 «Protection of workers from physical, chemical and biological agents at work and amendments and additions to P.D. 307/86 according to Directive 88/642/EEC»
  - P.D. 90/1999 «Establishment of exposure limit values and upper exposure limit values for workers exposed to certain chemical agents at work according to Directives 91/322/EEC and 96/94/EC and amendments and additions to P.D. 307/86, as it has been amended by P.D. 77/93»
  - P.D. 339/2001 «Amendments to P.D. 307/86 "Protection of workers from the risks related to exposure to certain chemical agents at work" »
  - P.D. 162/2007 «Protection of workers from the risks related to exposure to certain chemical agents at work, amending last version of P.D. 307/86 according to Directive 2006/15/EC»
  - P.D. 12/2012 «Amendments to P.D. 307/86 "Protection of workers from the risks related to exposure to certain chemical agents at work» according to Directive 2009/161/EU»
- Presidential Decree 395/1994, «Minimum Safety and Health Requirements for the Use of Work Equipment by Workers at Work (relevant to Directive 89/655/EEC)», as it has been amended by:
  - P.D. 89/99 «Amendments to P.D.395/94 according to Directive 95/63/EC»
  - P.D. 304/00 «Amendments to P.D.395/94, as it has been amended by P.D. 89/99»
  - P.D. 155/04 «Amendments to the last version of P.D.395/94 according to Directive 2001/45/EC»
- Presidential Decree 396/1994 "Minimum Health and Safety Requirements for the Use by Workers of Personal Protective Equipment at the Workplace (relevant to Directive 89/656/EEC)", as it has been amended
- Presidential Decree 338/2001 "Protection of the health and safety of workers from hazards caused by chemical agents at work"

- Ministerial Decision 34458/1990 "Technical specifications for the configuration, design, construction, safe operation and fire protection of refineries and other petroleum industries"

15.2. Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

16. ABBREVIATIONS

Abbreviations, acronyms

CAS	Chemical Abstracts Service
DSD	Directive 67/548/EEC
CLP	Regulation 1272/2008
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway
IMDG	International Maritime Dangerous Goods Code
ICAO-TI	International Civil Aviation Organization-Technical Instructions
RID	Regulations concerning the International Carriage Dangerous Goods by Rail
DMEL	Derived Minimum Effect Level
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
LOAEC	Lowest Observed Adverse Effect Concentration
LOAEL	Lowest Observed Adverse Effect Level
LOEL	Lowest Observed Effect Level
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
NOELR	No Observed Effect Loading Rate
LD50	Lethal Dose 50%
LC50	Lethal Concentration 50%
EL50	Effective Level 50%
ErL50	Effective Level 50% Reduction Growth Rate
LL50	Lethal Level 50%
PBT	Persistent, Bioaccumulative and Toxic
vPvB	very Persistent and very Bioaccumulative
SCC	Strictly Controlled Conditions
SCOEL	Scientific Committee on Occupational Exposure Limits
STOT	Specific Target Organ Toxicity
bw	Body weight
bw/day	Body weight/day
IARC	International Agency for Research on Cancer

References	IUCLID Chemical Safety Report Οριακές τιμές έκθεσης GESTIS (http://www.dguv.de/ifa/en/gestis/limit_values/index.jsp)
Issue date	
Revision Date	15-12-2015

Reason for revision	Update due to new occupational exposure limit values from GESTIS (section 8) and to the repeal of Directives 67/548/EEC and 1999/45/EC (section 2 and 3)
Additional information	
Disclaimer	MOTOR OIL (HELLAS) -CORINTH REFINERIES specifies that the information given refers only to the specific product, and only when it is not used in combination with another product. The information is accurate according to the current state of knowledge and experience of the product at the date of last revision. MOTOR OIL (HELLAS) – CORINTH REFINERIES S.A. accepts no legal responsibility from any losses or damages caused by other uses, not described above, or from any incorrect use, handling, storage or purchase of the product. It is on the sole responsibility of the user to take all the necessary precautions for the safe use of the specific product. The information and guidelines of this document should be made available to all users. If further information is needed, please contact the company at the above telephone numbers or address.

EXPOSURE SCENARIOS

ES 1: Manufacture of Kerosine - Industrial

ES 2: Distribution of Kerosine - Industrial

ES 3: Formulation & (Re)packing of Kerosine - Industrial

ES 4: Use of Kerosine as a Fuel - Professional

ES 5: Use of Kerosine as a Fuel - Consumer

ES.1. Manufacture of Kerosine - Industrial

Section 1 Exposure Scenario Title Kerosine	
Title	
Manufacture of Substance	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 15
Environmental Release Categories	1, 4
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure 0.5-10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent/ minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20

CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20

Section 2.2 Control of environmental exposure

Product characteristics

Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5.4e6
Fraction of Regional tonnage used locally	0.11
Annual site tonnage (tonnes/year)	6.0e5
Maximum daily site tonnage (kg/day)	2.0e6

Frequency and duration of use

Continuous release [FD2].

Emission days (days/year)	300

Environmental factors not influenced by risk management

Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-4
Release fraction to soil from process (initial release prior to RMM)	0.0001

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

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

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

Risk from environmental exposure is driven by freshwater sediment [TCR1b].
Prevent discharge of undissolved substance to or recover from onsite wastewater [TRC14]. Onsite wastewater treatment required [TCR13].

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 ≥ (%)	97.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	56.1

Organisation measures to prevent/limit release from site

Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].

Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.7
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d)	2.0e6
Assumed domestic sewage treatment plant flow (m3/d)	10000
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated [ETW4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated [ERW2].	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterization. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [DSU4]. Scaled assessments for EU refineries have been performed using site-specific data and are attached in Petrorisk file in IUCLID Section 13-"Site-Specific Production" worksheet [DSU6].	

ES.2. Distribution of Kerosine - Industrial

Section 1 Exposure Scenario Title Kerosine	
Title	
Distribution of Substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure 0.5-10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20 ^{0}C above ambient temperatures, unless stated differently G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent/ minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20

CS14 Bulk transfers	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20

Section 2.2 Control of environmental exposure

Product characteristics

Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].

Amounts used

Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5.4e6
Fraction of Regional tonnage used locally	2.0e-3
Annual site tonnage (tonnes/year)	1.1e4
Maximum daily site tonnage (kg/day)	3.6e4

Frequency and duration of use

Continuous release [FD2].

Emission days (days/year)	300

Environmental factors not influenced by risk management

Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	1 .0e-3
Release fraction to wastewater from process (initial release prior to RMM)	1.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.00001

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

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

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

Risk from environmental exposure is driven by freshwater [TCR1a].
No wastewater treatment required [TCR6].

Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0

Organisation measures to prevent/limit release from site

Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].

Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d)	2.6e6
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterization. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [DSU4].	

ES.3. Formulation & (Re)packing of Kerosine - Industrial

Section 1 Exposure Scenario Title Kerosine	
Title	
Formulation & (Re)packing of Substances and Mixtures	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure 0.5-10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20^0 C above ambient temperatures, unless stated differently G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent/ minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems)	No other specific measures identified. EI20
CS16 General exposures (open systems)	No other specific measures identified. EI20
CS2 Process sampling	No other specific measures identified. EI20
CS36 Laboratory activities	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20

CS30 Mixing operations (open systems)	No other specific measures identified. EI20
CS34 Manual / CS22 Transfer from/pouring from containers	No other specific measures identified. EI20
CS8 Drum/batch transfers	No other specific measures identified. EI20
CS100 Tabletting, compression, extrusion or pelletisation	No other specific measures identified. EI20
CS6 Drum and small package filling	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20
CS85 Bulk Product Storage	No other specific measures identified. EI20

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5.2e6
Fraction of Regional tonnage used locally	5.8e-3
Annual site tonnage (tonnes/year)	3.0e4
Maximum daily site tonnage (kg/day)	1.0e5
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive Requirements)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	2.0e-4
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TRC14].	

If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	86.0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d)	2.6e5
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	

Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterization. G37.

Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.

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

ES.4. Use of Kerosine as a Fuel – Professional

Section 1 Exposure Scenario Title Kerosine	
Title	
Use as a Fuel	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure 0.5-10 kPa at STP. OC4.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20^0 C above ambient temperatures, unless stated differently G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures (Skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin effects that may develop. E3
CS15 General exposures (closed systems).	No other specific measures identified. EI20
GEST_12I Use as a fuel. CS 107 (closed system)	No other specific measures identified. EI20
CS14 Bulk transfers	No other specific measures identified. EI20
CS22 Transfer from/ pouring from containers	No other specific measures identified. EI20
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20

CS85 Bulk Product Storage	No other specific measures identified. EI20
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	4.4e6
Fraction of Regional tonnage used locally	5.0e-4
Annual site tonnage (tonnes/year)	2.2e3
Maximum daily site tonnage (kg/day)	6.1e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from wide dispersive use (regional only)	1.0e-3
Release fraction to wastewater from wide dispersive use	0.00001
Release fraction to soil from wide dispersive use (regional only)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d)	6.9e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated [ERW3].	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the PETRORISK model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Risk Management Measures are based on qualitative risk characterisation. G37. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Users are advised to consider national Occupational Exposure Limits or other equivalent values. G38. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
4.2. 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). [DSU4].	

ES.5. Use of Kerosine as a Fuel - Consumer

Section 1 Exposure Scenario Title Kerosine		
Title		
Use as a Fuel		
Use Descriptor		
Sector(s) of Use		21
Product Categories		13
Environmental Release Categories		9a, 9b
Specific Environmental Release Category		ESVOC SpERC9.12c.v1
Processes, tasks, activities covered		
Covers consumer uses in fuels.		
Assessment Method		
See Section 3.		
Section 2 Operational conditions and risk management measures		
Section 2.1 Control of consumer exposure		
Product characteristics		
Physical form of product		liquid
Vapour pressure		Liquid, vapour pressure > 10 Pa (STP)[OC15]
Concentration of substance in product		Unless otherwise stated, covers concentrations up to 100% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to 50000g [ConsOC2]; covers skin contact area up to 420cm^2 [ConsOC5]
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC1 4]
Other Operational Conditions affecting exposure		Unless otherwise stated, assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8]
Product Category		**Specific Risk Management Measures and Operating Conditions**
PC13: Fuels-Liquid -: Refueling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year [ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm^2 [ConsOC5]; for each use event, covers use amounts up to 50000g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m^3 [ConsOC11]; for each use event, covers exposure up to 0.05hr/event [ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
Section 2.2 Control of environmental exposure		
Product characteristics		
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].		
Amounts used		
Fraction of EU tonnage used in region		0.1
Regional use tonnage (tonnes/year)		1.8e5
Fraction of Regional tonnage used locally		0.0005
Annual site tonnage (tonnes/year)		89
Maximum daily site tonnage (kg/day)		245
Frequency and duration of use		

Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from wide dispersive use (regional only)	1 .0e-3
Release fraction to wastewater from wide dispersive use	0.00001
Release fraction to soil from wide dispersive use (regional only)	0.00001
Conditions and measures related to municipal sewage treatment plant	
Risk from environmental exposure is driven by freshwater [STP7a]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.1e4
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated [ERW3].	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSATGD. Where exposure determinants differ to these sources, then they are indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in Section 2 are implemented. G39. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.	
4.2. 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 [DSU1]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	